JANUARY • 1948

TOOL & DIE JOURNAL

TOOLING and PRODUCTION

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With Hollow Ground Spiral Flutes
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TOOL & DIE JOURNAL

Editorial and Publication Offices
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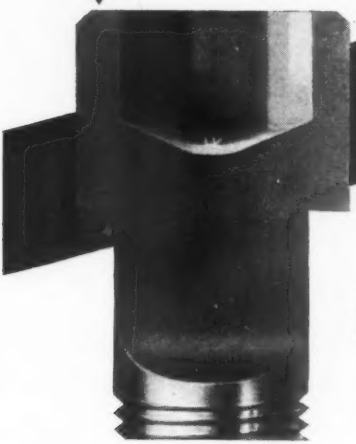

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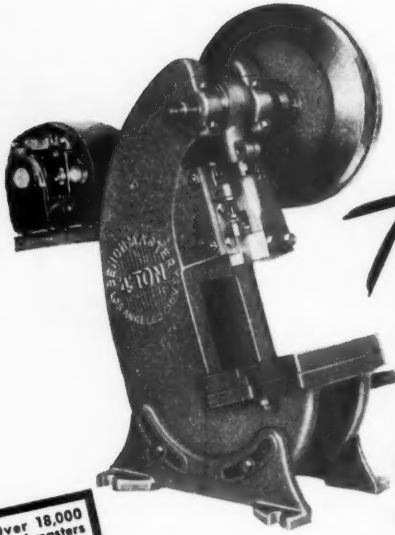

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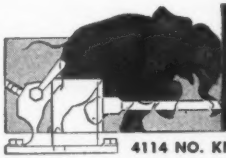

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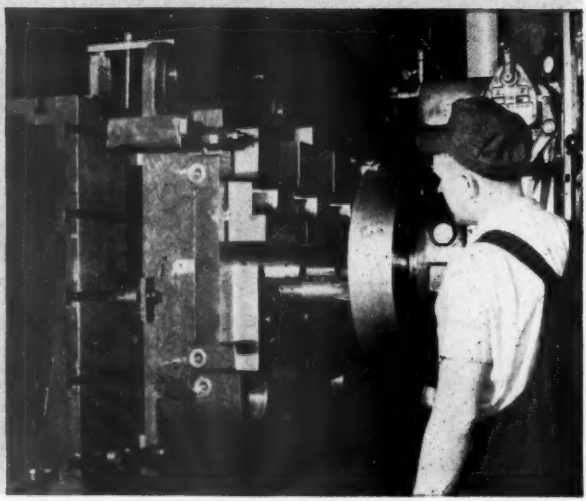

New equipment installed in the Danly shop permits us to do any machine work on large or complex die sets incidental to the mounting of the dies. Inserts, recesses, additional boring, keyways and other machining can be done to the customer's specifications.

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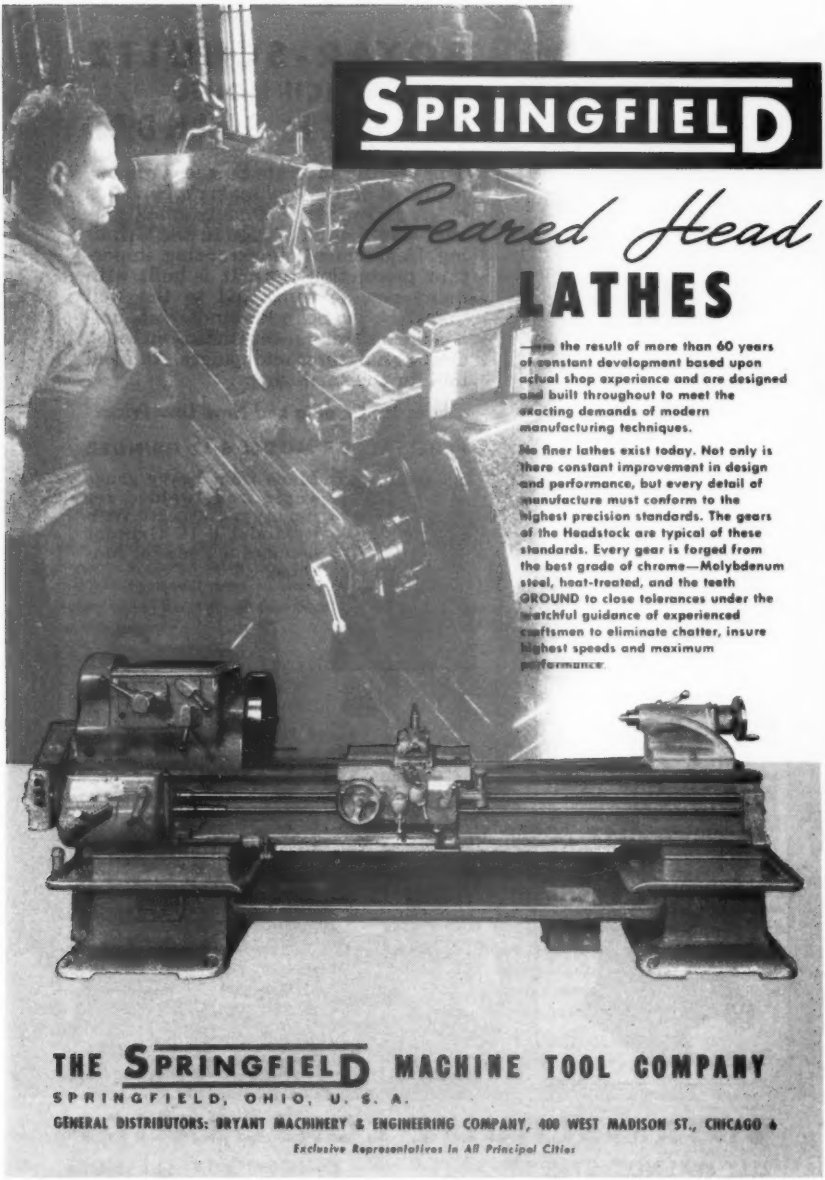
MACHINED TO YOUR SPECIFICATIONS



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Exclusive Representatives in All Principal Cities

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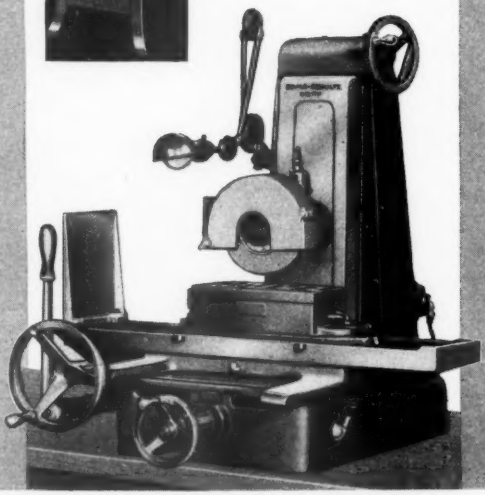

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*Longer strokes available upon special order.

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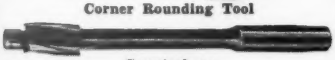

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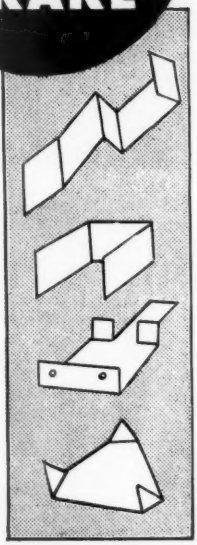
from FLAT SURFACES TO INTRICATE SHAPES

with the New

DI-ACRO BRAKE



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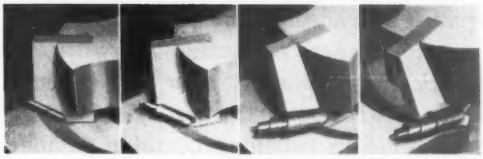

• Illustration above shows chip formation with Ingersoll patented Shear Clear Face Mill. Available with High Speed Steel, Cast Alloy, or Carbide Tipped blades, and with angles suitable for cast iron, steel, or aluminum. Did you see the Carbide Tipped Shear Clear milling die block steel at Ingersoll booth in Chicago?

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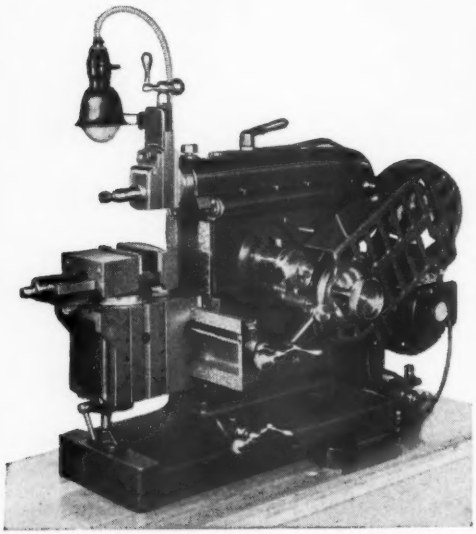

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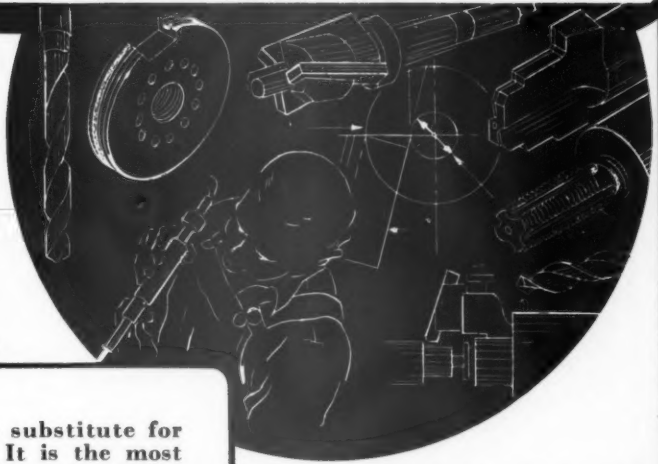

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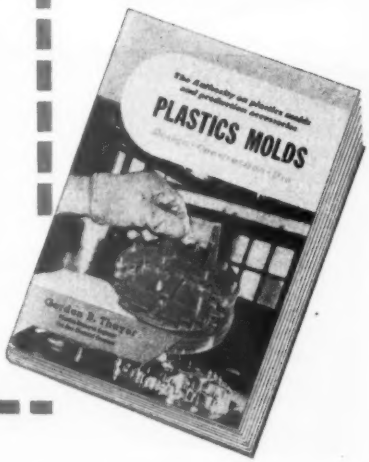

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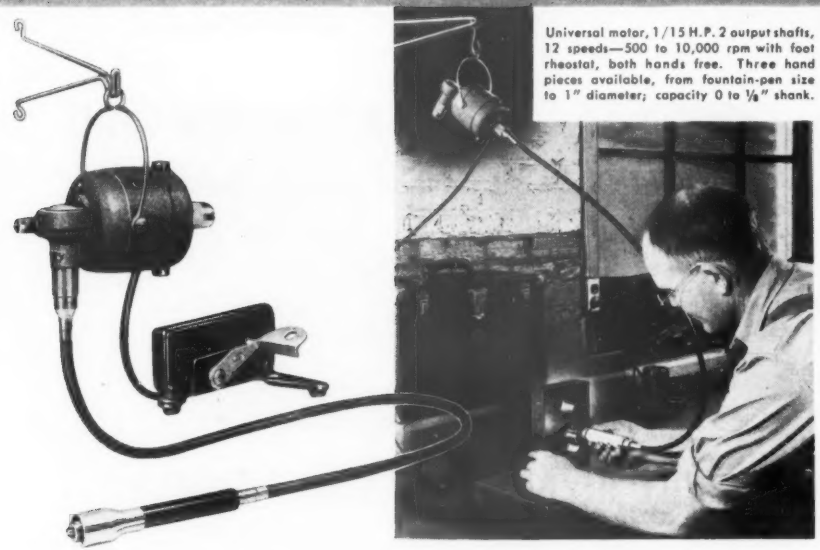

Universal motor, 1/15 H.P. 2 output shafts, 12 speeds—500 to 10,000 rpm with foot rheostat, both hands free. Three hand pieces available, from fountain-pen size to 1" diameter; capacity 0 to 1/8" shank.

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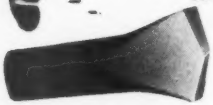
RACINE, WISCONSIN

IT WAS A STEP FORWARD

When grampa changed from the

Old Flat Drill



to the

Modern Twist Drill

IT WILL BE ANOTHER STEP FORWARD

When YOU change from the

Old Hook Type Boring Tool

to the

Modern Precision Boring Tool

WITH the old type of tool the clearance is usually ground by hand; even an experienced operator finds it difficult to control the clearance angles.

With the Precision Bokum Boring Tool the proper clearance is built into the tool. All resharpening is done from the top surface only, in this respect the tool is like a form tool wrapped around a shank, the curvature being such that the clearance angle remains constant throughout the life of the tool. As with any form tool the life of the Bokum Boring Tool is many times that of an ordinary tool.

Available: Wide range of sizes for boring holes from $\frac{3}{32}$" dia. up . . . in super high speed steel and Carbide Tipped.

Ask for catalog E1139 for super high speed tools and for E398 for carbide-tipped.

For general boring, use Style A
For facing and bottoming, use Style B
For internal threading, use Style C

TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL CO.

14775 WILDEMERE AVE. · DETROIT 21, MICH.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

INTERESTED IN A 300% INCREASE IN STAMPING PRODUCTION USING YOUR PRESENT PRESSES?

Photo courtesy of Federal Tool Corp., Chicago, Ill. Designers and builders of 9 Station Progressive Dies

THIS IS NO FAIRY TALE. Dickerman Die Feeds are actually increasing production 300% or more in many shops. They will do the same for you, used on your present punch presses.

Send for Free Catalog Today!

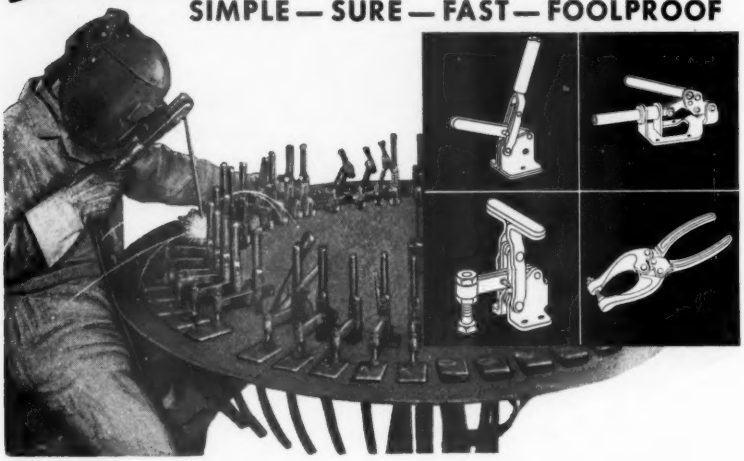
IN ADDITION, they reduce operator hours 80 to 90 percent, due to their accuracy, reliability, versatility. They increase die life through elimination of costly jams and crack-ups — can be attached to any press.

THESE FIGURES ARE FACTS, so why look further? Replace worn punch press feeds NOW with the new improved Dickerman Die Feeds. Send for free illustrated catalog TODAY.

H. E. DICKERMAN MFG. CO.
323-15 ALBANY STREET • SPRINGFIELD, MASS.

SMART TOOLING!

SIMPLE — SURE — FAST — FOOLPROOF

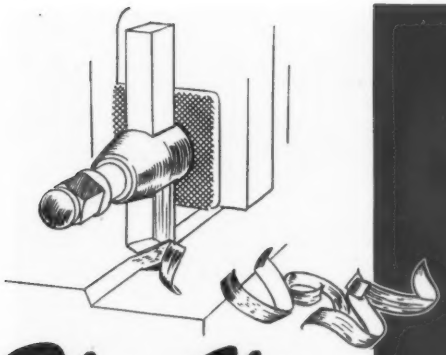


Here's efficient tooling based on the quick action and positive holding power of De-Sta-Co Toggle Clamps. This simple turntable with its 48 No. 210-S clamps enables one welder to keep abreast of two helpers. One places curved shank in socket and unloads finished assemblies. The other locates pierced hole in plate over shank and locks securely with toggle clamp. The expert welder works without interruption.

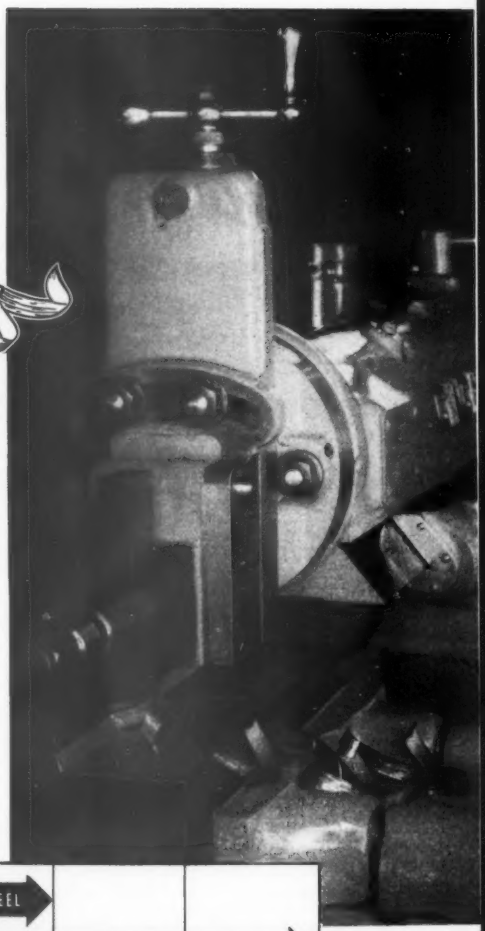
Smart tooling like this is the backbone of modern mass production technique. You'll see De-Sta-Co Toggle Clamps playing a similar vital part *wherever* the principles of sound tool engineering are observed.

Welding production is *only one* of the many fields for quick acting clamps. For holding parts in milling, drilling, routing, riveting, cementing—for fast, uniform, *foolproof* action—progressive tooling demands De-Sta-Co adaptability and quality. There's a De-Sta-Co clamp for every job, designed and built to stand up under the wear and tear of volume production. Send for copy of Catalog No. 47.

DETROIT STAMPING COMPANY
344 Midland Ave. Detroit 3, Mich.



Blue Chips



Cincinnati Shapers cut blue chips that are profitable chips. Blue chips come from tough die steels that present unusually tough machining problems.

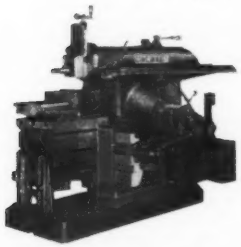
The machine must be accurate in performance, must deliver unusual power at the cutting tool, and must have great stamina. On these things hinges the profitable handling of these tough steels.

Cincinnati Shapers, with their outstanding performance, are found in large numbers in tool and die plants everywhere.

Our representative in your neighborhood will gladly consult with you on increasing accuracy and profit in your shop.

Our Engineering Department is at your service. Ask their advice on your shaping problems.

Write for Catalog N-3



• THREE TIMES AS TOUGH . . .
By test, die steels are often three times as tough as mild steel—and machining demands are correspondingly more severe.

THE CINCINNATI SHAPER CO.
CINCINNATI 25, OHIO U.S.A.
SHAPERS · SHEARS · BRAKES

NOW A MOLDMAKER'S TOOLROOM LATHE

WITH A PLUS FOR PLASTICS MOLDMAKERS

A complete range of lead variations—you can set your machine for any one of them in exactly one and one-half minutes!

Compare that performance with a normal toolroom lathe's—and change gears requiring thirty minutes to change. Think what you'll save on production time—and on original investment in change gears, too—especially if any sizable share of your production is thread molds for plastics.

Principal among the patented features of this new Monarch moldmaker's toolroom lathe is the adjustable leadscrew variating mechanism—a device that makes it a simple matter to compensate for the shrinkage of the material to be molded. Plastic thread molds become a mere routine production operation.

Then there's a speed-reducer—that permits slowing down to a *fraction of a revolution a minute* for internal and external milling operations, performed at a single setting of the mold in the lathe.

Add to these the features built into every Monarch toolroom lathe (and the machine is equally adaptable for normal toolroom work)—features that have a proved record for precision and long life. The result is a machine you can't afford to be without if you have any plastics production. Like more facts? Ask for specification sheet 405—or call your nearest Monarch representative.

Monarch TURNING MACHINES

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO

Firthaloy shop service

is practical and its benefits tangible.

Firthaloy Shop Service is a part of the purchase of every Firthaloy Die—and you are entitled to it. It gives you Firthaloy experienced die men who help you to

—set up die rooms

—train die room men in re-working dies

—help improve Firthaloy Die performance

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Our Service Men* have always been able to assist our *customer's shop men.

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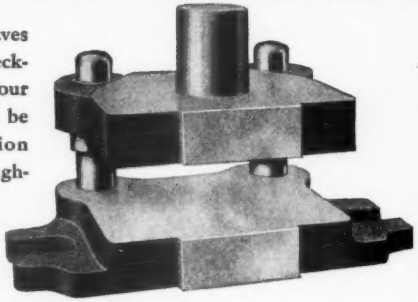
✓CHECKED . . FOR TROUBLE-FREE PRODUCTION

Not a single Die Set ever leaves Producto without a strict check-up of every vital point. Your specifications are orders to be obeyed . . . your production results will prove our thoroughness.



FROM NEAR-NEIGHBOR POINTS

To save you time, Producto stocks Die-Sets at major tooling centers from coast to coast. Select our nearest assembly and service plant from the list below.

and DOWEL PINS *too*

Make Producto your source of supply for the close tolerance die maker's accessories you need in a hurry . . . pins, springs, stripper bolts, screws, adapters, etc. All are neatly packed for easy identification.

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Bridgeport 4-9481

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SAN FRANCISCO 7, CAL. Jamison Steel Corp. Exbrook 2230

BALTIMORE 2, MD., L.A. Benson Co., Inc. Plaza 0340

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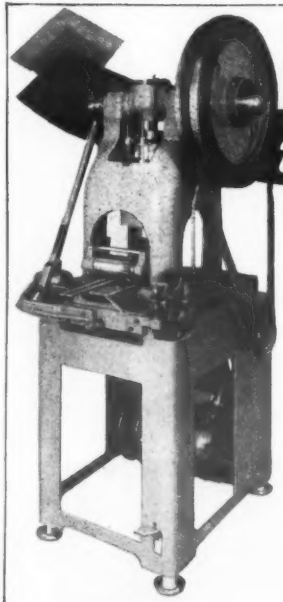
DIEBEL HI-SPEED AUTOMATIC PRESSES



12 TON PRESS
65-300 STROKES
PER MINUTE

DEPENDABLE SERVICE
INCREASED PRODUCTION
EFFICIENT PERFORMANCE
BUILT-IN AUTOMATIC FEED
ECONOMICAL TO OPERATE
LOW INITIAL COST

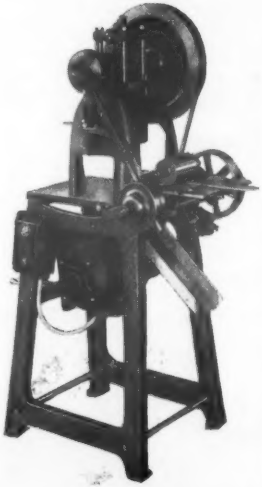
Twelve ton press equipped with single stroke operation clutch.

Presses are available with a double system of feeding with a set of rollers front and rear.

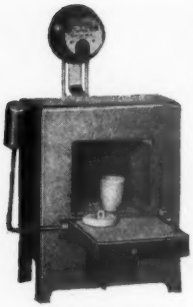
Diebel presses are employed with ferrous and nonferrous metals, fiber, plastics, rubber, and paper.

Complete details will be provided promptly on request.

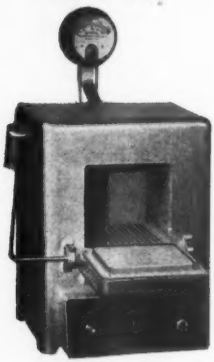
5 TON PRESS
180-550 STROKES
PER MINUTE



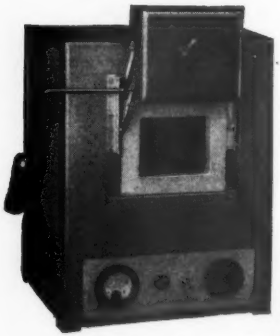
DI MACHINE CORP.
2708 IRVING PARK ROAD • CHICAGO 18, ILLINOIS



MODEL GTP



MODEL CEA



MODEL OFE

TEMCO

ELECTRIC FURNACES

With the new TEMCO stepless control you can select and hold any desired temperature.

Model GTP—interior 4″ x 3¾″ x 3¾″. May be operated continuously up to 1500° F. and intermittently to 1850° F. Embedded heating element. Power consumption 1.2 kw. Cast aluminum body. Weight 15 pounds.
For 115V A.C.....**Price $57.50**
Also available for 230V and D.C.

Model CEA—interior 4¾″ x 4¼″ x 6″. Maximum continuous temperature 2000° F. Element is embedded for its protection and surrounds muffle chamber for uniform heating. Power consumption 1.5 kw. maximum. Insulated aluminum body. Weight 31 pounds.
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Also available for 230V and D.C.

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TEMCO furnaces have low initial cost and are economical to operate as nearly all the power is consumed within the heating chamber. They are fast heating and ideal for general laboratory uses, heat-treating and small unit production.

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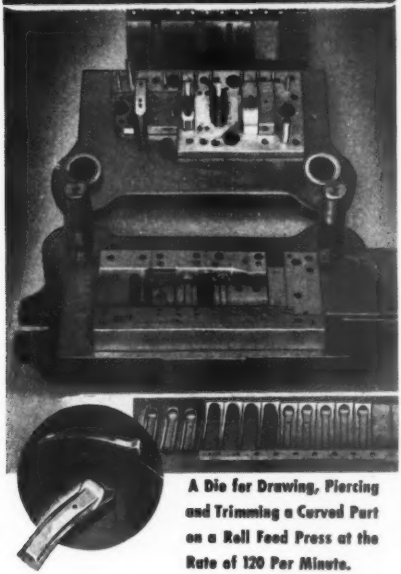

A Die for Drawing, Piercing and Trimming a Curved Part on a Roll Feed Press at the Rate of 120 Per Minute.

Quality Tools such as this die, reduce production costs by combining many operations in a single tool.

Federal equipment, with latest modern techniques and skilled personnel are available for building all types of Dies, Jigs, Fixtures, Molds and Special Tools.

Let us quote on your tooling requirements.

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401 N. Leavitt Street
CHICAGO 12, ILLINOIS

Put the "POCKET-SIZE MACHINE SHOP" to Work!

MOTO-TOOL No. 2 WITH EMERY POINT

$16.50

DREMEL'S Improved MOTO-TOOL . . . the little electric grinder that does big jobs . . . can save you hours, by speeding up work now being done by hand. Invaluable for sharpening taps, drills, gauges, chisels, tools and cutters (without tearing down "set-ups"). Dremel Moto-Tool is a "war veteran" . . . used by all branches of the Armed Forces in far-flung repair bases . . . helped to set production records at General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Northrup, Douglas and other plants.

Approx. 27,000 R.P.M.

Look for These MOTO-TOOL Features

● Housing has "pencil-type" finger grip ● Instant-action, wrenchless chuck ● Oil-less, sealed, trouble-proof bearings ● Patented automatic chuck lock pin ● Oversize armature shaft, hardened, ground and polished ● 110 volt, universal type (AC-DC) motor ● Easily replaced commutator brushes ● About 27,000 R.P.M.; cuts cleaner . . . saves cutters ● Sliding snap-type switch ● Handy hanger hook ● Cord protector ● Sturdy, shock-proof bakelite housing ● Dust-filtered air-cooling system ● Weighs only 13 oz. . . . shaped to fit the hand ● Dynamically balanced for vibrationless operation.

MOTO-TOOL KIT No. 2

WITH 23 ACCESSORIES

$23.50

PRE-WAR PRICES STILL PREVAIL

MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-Tool in natural finish, hardwood case.....$23.50. (Items purchased separately would cost about $30.00; you save $6.50.)
Moto-Tool No. 2, with one emery point $16.50

See your mill supply dealer. If he does not handle Moto-Tool, write the factory.

DREMEL MANUFACTURING CO.
Dept. 528-A Racine, Wis.

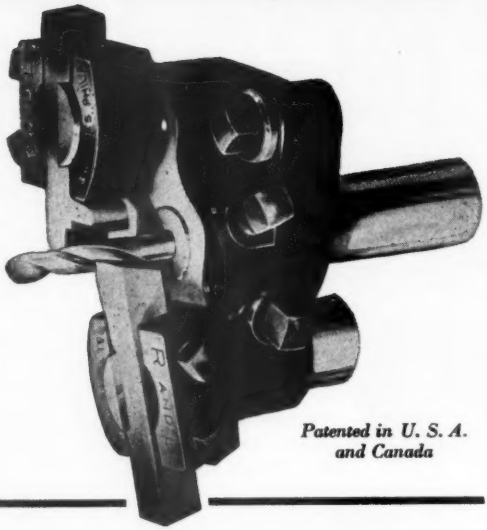
1=14 @ 1/4 The Cost

When The Tool Is an R and L Combination Turning Tool

One R and L Combination Turning Tool, the only combination right hand and left hand tool on the market, actually does the work of 14 tools.

You can use an R and L for all these right hand or left hand applications: Roller Box Tool • Centering and Facing Tool • Knee Tool • Pointing Tool • Back Rest • Floating Drill Holder • Balanced Turning Tool.

The change from right to left or vice verse takes only ten seconds.



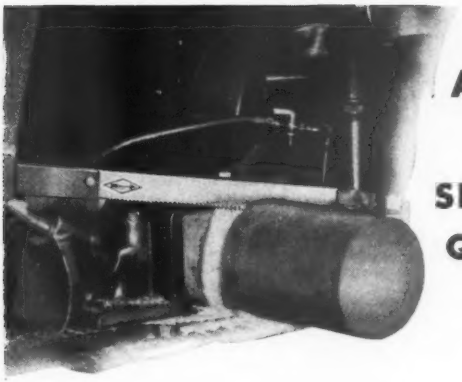
Patented in U. S. A. and Canada

√ *CHECK THESE OUTSTANDING FEATURES*

- **Made of extra tough, heat treated alloy steel, unconditionally guaranteed not to bend or give way.**
- **Essential parts ground to extreme accuracy affording perfect alignment at any point of adjustment.**
- **Back Rests, or burnishers, have almost diamond hard surfaces eliminating metal pick-up and marring of work surface.**
- **Interchangeable Roller Back Rests furnished if desired.**
- **Precise adjustment on both cutting tool and pressure of burnishers.**
- **Tool bits wear longer because they are ground only on top side, or end.**
- **Less cross-slide clearance required, saves time or often permits working with cross-slide tools while turning or drilling.**
- **On turnings, the R and L Combination Tool produces highly polished surfaces, true to size, and straight.**
- **Usable either for roughing or finishing; extra heavy cuts possible because thrust is always in direct line with Back Rest.**
- **Longitudinal adjustment permits turning of two diameters to any length within tool capacity.**

All these and many other features are shown by photographs and drawings in descriptive booklet mailed without cost or obligation. The booklet illustrates the tool set-up for various operations, and indicates speed and simplicity of its adaptation to various jobs. Prices and full specifications of many available sizes are included. Write for your copy today.

R and L TOOLS *1825 Bristol St., Philadelphia 40, Pa.*



Can You Answer "Yes" TO THESE SIX IMPORTANT QUESTIONS?

1 Am I obtaining maximum number of square inches cut per blade?

2 Am I using correct feed and speed to balance production against tool cost?

3 Do I use correct length and pitch of blade for size and type of material being cut?

4 Am I nesting materials in the most efficient manner?

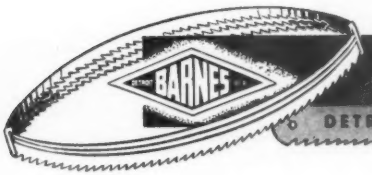
5 Am I cutting my material in the shortest possible time consistent with normal blade life?

6 AM I USING THE RIGHT BLADE?

IF you can answer "yes" to all six, then you can be sure your production hack saws are operating most efficiently. The Barnes Hack Saw Production Calculator (free on request) has information that will enable you to answer "yes" to some of these questions; Barnes Service Engineers can give you the correct answers to *all of them!*

Why not let us match our top quality hack saw blade plus our knowledge of metal sawing against your cutting problems. Then you are assured your production power hack saws will deliver maximum cutting efficiency.

Your Barnes Distributor will have a Barnes Service Engineer call on you whenever you say—no obligation.



ESTABLISHED 1919

W. O. BARNES CO., INC.

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Indispensable in the Tool Room and Machine Shop . . . Adaptable for General Engraving, Brass Routing, Die and Mold Duplicating

This new 0-16A *Gorton Super-Speed mill incorporates all of the features necessary in an "all purpose" machine. It will do a better job for you on any work within the limits of its size.

The Gorton 0-16A is *rugged*. It is designed for operator convenience and features extremely sensitive table and saddle controls. Spindle speeds from 300 to 10,000 R.P.M. available. ½ H.P. motor.

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DESIGNED FOR VERSATILE DUTY—Check These Features

Heavy column, adjustable ram, super-speed spindle permanently lubricated, swivel or universal head, positive spindle brake, spindle lock, quill lock, depth stop graduated in thousandths, micrometer and lever feed on spindle.

Adaptable for . . .

. . . General engraving and brass routing by using special extension spindle and foot treadle attachments . . . Die and mold duplicating by adding tracer head and duplicator table.

FREE ... FREE

...ON NEW 0-16A *GORTON SUPER-SPEED SWIVEL HEAD, UNIVERSAL HEAD MILL ... WRITE FOR BULLETIN NO. 1655-1201 NO OBLIGATION, OF COURSE.

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GEORGE GORTON MACHINE CO.
Tracer Controlled Milling
1201 RACINE STREET • RACINE, WISCONSIN, U. S. A.

THE NEW AIR-OPERATED ALLEN DIAL FEED TABLE

Solve That SPECIAL Production Problem with our STANDARD Feed UNITS

For use with PUNCH PRESS, DRILL PRESS, PRODUCTION MILLER, SPOT WELDER, etc.

Recommended for assembling, punching, machining of nuts, stampings.

MODEL A— A 3-way valve, actuated by some motion from the machine to which the table is to be synchronized, allows compressed air to move a hardened and lapped piston to operate the Pawl arm. The Pawl indexes the plate and LOCKS it in the indexed position until the valve is released allowing a spring to return the Pawl, ready for the next indexing.

Model A is available in two sizes:

No. 7¼-A,—7¼" Index Plate, 9" Base, 2 15/16 overall height—$125.00

No. 11-A, — 11" Index Plate, 14" Base, 4" overall height — 175.00

Special Index Plates available with from 8 to 40 notches. 12-position is standard.

MODEL B— An adaptation of Model A wherein a special control valve is incorporated so that the plate is automatically self-indexing. By merely turning a screw speed is adjustable from one indexing each half second to one each ten seconds. The table is locked in position between indexings. Recommended for soldering, assembly, etc., where no mechanical motion is available.

Model B is available in two sizes:

No. 7¼-B, (specifications same as Model 7¼-A)—$155.00

No. 11-B, (specifications same as Model 11-A)— 205.00

ACCESSORIES— *Specially designed and made for use with Allen Dial Feed Tables.*

- Air-operated down clamps and side clamps with 4X power factor are available for holding the work piece.
- Knockout for ejection of the work piece from the index plate.
- Special 2- and 3-way valves to synchronize the clamps and knockout with the table motion thereby tremendously increasing the versatility of operation.

We invite inquiries concerning your special problems. Our engineering department is ready to cooperate with you.

Write for illustrated brochure.

Prices F.O.B. Brooklyn, New York

Manufactured by

The A. K. ALLEN COMPANY

3011 Ft. HAMILTON PARKWAY • BROOKLYN 18, N. Y.

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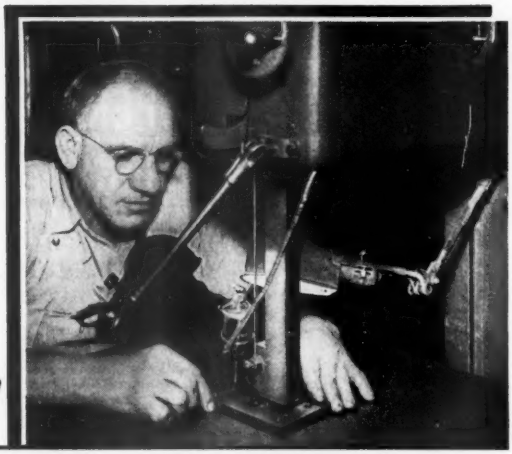
BAND SAW BLADES

for Smoother



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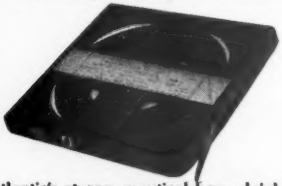
ATLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

Atlantic Saw Mfg. Co.

INCORPORATED

Exclusively Manufacturers of Band Saw Blades

160 Brewery St., New Haven, Conn.

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Is Every Manufacturing Operation in Your Plant Really Efficient?

Is there some one place where a specially designed machine would save minutes and dollars?

BUNELL has the Equipment and Trained Man Power

Perhaps you have not yet decided what the machine should be . . . possibly only a slight change or attachment to present equipment is required.

. . . But, as long as there is the least doubt as to the present efficiency of the operation . . . and loss of profit, why not have Bunell engineers make a study of your specific problem?

Our technicians are specialists in all phases of methods of manufacture . . . the design of special equipment for specific operations . . . the development of attachments for existing equipment.

Many customers find that Bunell service eliminates that one weak link in an otherwise excellent factory set-up.

You have nothing to lose . . . and on the other hand you may reduce your cost of manufacturing . . . by contacting Bunell.

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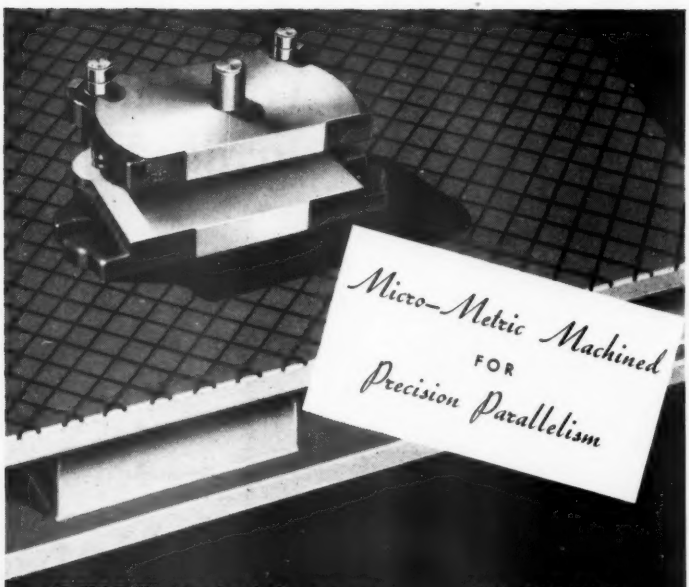

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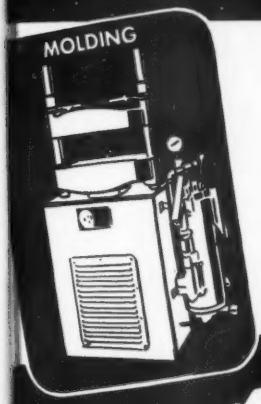

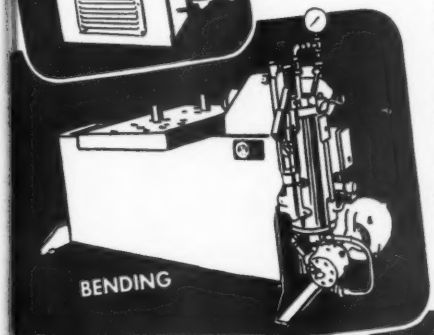

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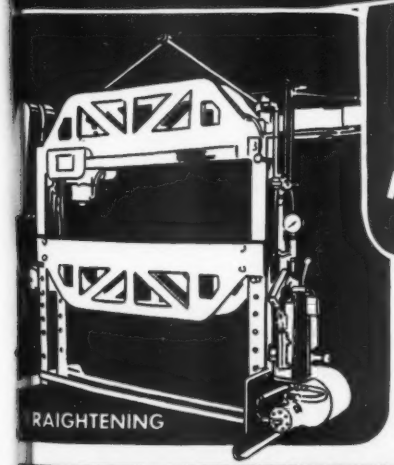

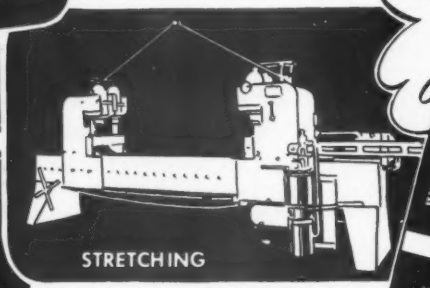

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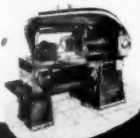

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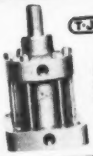

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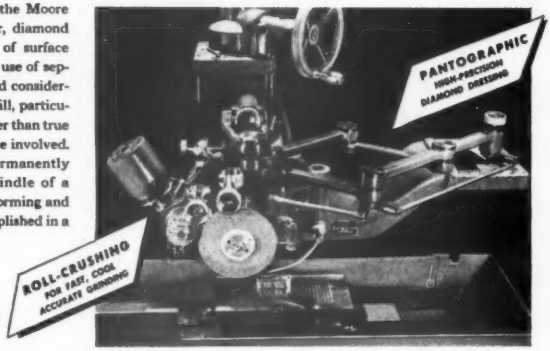

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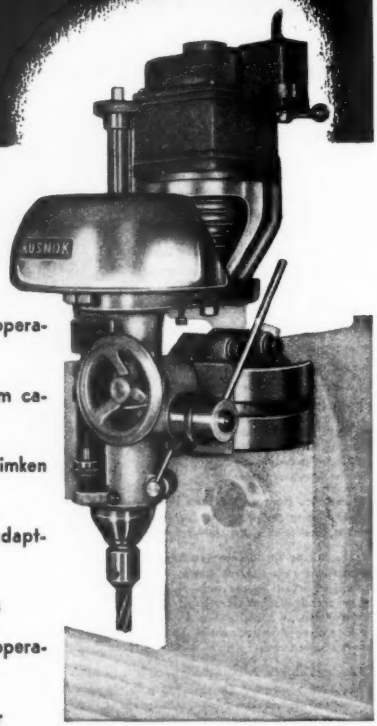

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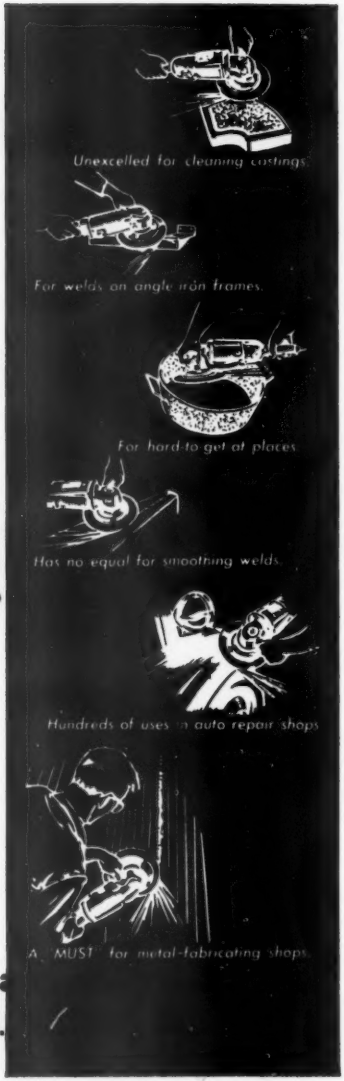
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From tool room to production line, our emphasis on TOOLING & PRODUCTION encompasses the working of ferrous and non-ferrous metals, and plastics, by the most advanced manufacturing practices in industry today: cutting, forming and molding, in all their variations and ramifications.

In programming our 1948 editorial presentations we will be "aiding and abetting" the governing philosophy of our economics of enterprise and manufacture, i.e., that we have to produce more and more of everything, both to satisfy this country's needs and to enable us to render business-building assistance overseas. Because of increasing labor and materials costs, this "more of everything" will have to be produced faster, with less waste of materials and with fewer man-hours per unit of manufacture.

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More, Faster, Cheaper, TOOLING & PRODUCTION; the investment is made in the tool room or tool shop; the dividends show up on the production line. More, Faster, Cheaper, TOOLING & PRODUCTION; the know-how of it and the show-how of it are what our readers will employ to meet 1948's competition.

It is what they will buy, and it is what must be sold.

E. Willard Pennington

editor

Die Casting Die Design

***Part I*—Ejection of the Die Casting from the Die; Method of Ejection: Ejector Pins, Design of Ejection Pins, Square and Rectangular Ejector Pins; Methods of Ejection other than by Ejector Pins, Air Ejection; Dimensioning the Pin.**

by H. K. Barton*
and
J. L. Erickson**

Ejection of the Die Casting from the Die

Die casting dies are comprised essentially of two separate steel blocks which fit together and which have machined in their two meeting faces 1) a cavity, or negative impression of the part to be die cast, and 2) a system of channels, or runners, to enable the molten metal to pass from a sprue hole (where the molten metal enters the die) to the die cavity where the part is cast. The die casting die halves are fitted with leader or guide pins to assure their proper alignment as they are brought together in the closed position. There is also provided a mechanical means of ejecting the casting from the cavity after the casting has been formed in it and the die halves are opened or separated.

The die halves are mounted in die casting machines on platens. In the majority of cases one die half is fixed to a stationary platen and the other die half is fixed to a movable platen; thus one of the principal functions of a die casting machine is to facilitate the opening and closing of die casting dies.

Only in rare cases is the geometrical nature of a die cavity such that it is possible for the part cast in it to merely shrink away from the impression and fall out as the die halves are opened. In the vast majority of instances the geometry of the cavity is such that the part made therein cannot just fall out. It is customary therefore to design parts which are to be die cast in such a way that their negative impressions will permit the part cast in them to shrink away and free

H. K. Barton is an internationally-known expert in the science of die casting, practicing both in England and on the continent as a consultant on die casting and related processes. Mr. Barton has written many of Europe's best practical and theoretical articles on the die casting process. A former student of Dr. Leopold Frommer of Germany, he combines the best in scientific training with a thorough practical knowledge gained at first hand from work with many foremost European die casters. Born in San Jose, California, he is further known through his contributions to "Die Castings" magazine.

**J. L. Erickson was educated in metallurgy and mechanical engineering at the University of California and California Institute of Technology. He became interested in die casting and was employed as a die casting machine operator at the Harvill Aircraft Die Casting Corporation, Los Angeles, while attending the University. Joining the Harvill organization as chemist upon leaving the University, Mr. Erickson has followed his career in the capacities of Chief Metallurgist, Western Die Casting Company, Emeryville, California; Plant Manager, Pryor Manufacturing Company, Mansfield, Ohio; Chief Die Casting Engineer, Barnes Manufacturing Company, Mansfield, Ohio; and is currently Director of Engineering and Sales, Lukens Aluminum Company, a contract die casting plant of Dayton, Ohio. Mr. Erickson also has served as Associate Editor of both "Light Metal Age" and "Die Castings" magazines.*

itself easily from the stationary half of the die and to shrink onto the movable half of the die. Consequently, when the die casting machine opens the die, the part will remain adhered to the movable half of the die.

The movable half of the die is provided with the ejector system which gently forces the hot die casting out of this die cavity so that the die casting can either drop into a suitable chute or be caught and removed by the die casting machine operator.

Method of Ejection: Ejector Pins

The ejection of the die casting from the movable half of the die is generally accomplished by the forward motion of ejector pins which travel through holes in the movable member of the die to contact the die casting, Figure 1. The ejector pins are fixed at their opposite ends to an ejector plate which is parallel to the face of the die. When the die is in the closed position the ejector pin heads are flush with the die cavity. As the die is opened, or after it has opened, the ejector plate in which the ejector pins are mounted is forced forward by push rods that bear on its back side. As the ejector plate moves forward it carries with it the ejector pins which are fixed to it; these ejector pins in turn strike the casting, or attached ejector pads, Figure 2, and force the die casting out of the die cavity. The push rods that bear on the ejector plate may be either mechanically, hydraulically, or hand activated.

The ejector plate, Figure 1, has attached to it "return-pins" or "push-back-pins" as they are variously termed. These project through the movable half of the die but do not enter the die cavity; that is, they extend out through the face of the die where there is no cavity. As the die halves are closed, the opposing die member strikes the projecting push-back pins and forces the ejector plate back. Their length of extension beyond the face of the die is regulated so that when they are pushed back flush with the die block face they have moved the ejector plate and, consequently, the ejector pins back until they in turn are flush with the contour of the die cavity surface.

The positioning and design of ejector pins is vitally important for their im-

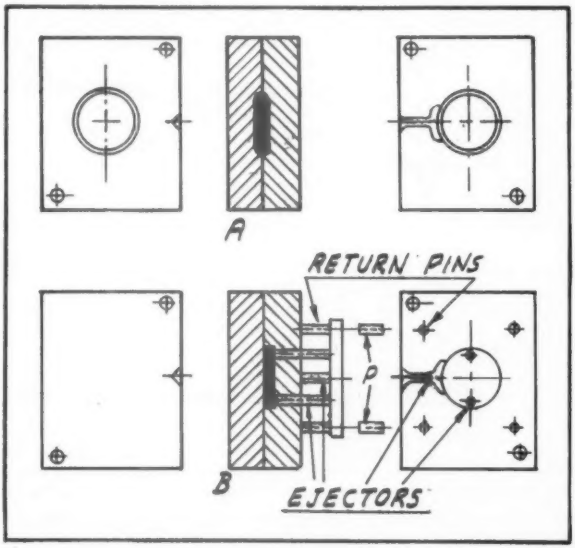


Fig. 1. The two halves, one stationary and one movable, of a die casting die. Both of the cavity faces are shown in the upper drawing "A". In the lower drawing "B" is shown how an ejector plate is positioned behind the movable die member. Details in "B" also show the locations of the ejector pins and the ejector plate return pins.

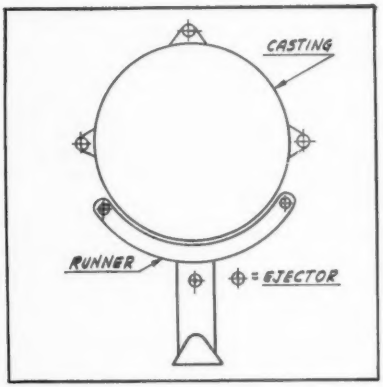


Fig. 2. Showing the ejector pin locations on a casting and runner. Note how unsightly ejector pin marks on the casting are avoided by having the ejector pins strike off-set pads instead of on the casting proper.

proper functioning leads to needless non-productive downtime.

In positioning ejectors it must be remembered that they will be striking upon a hot die casting; a hot die casting that does not have the strength at elevated temperatures that it will have at room temperature. At elevated temperatures the casting is easily deformed or distorted by small stresses. A certain force will be required to push out, or push off, the casting from the die cavity of the movable die half. The magnitude of this force is dependent upon the geometry of the die cavity and, more especially, on the extent* to which the die casting shrinks onto this half of the die. Some die castings require only a small force of ejection; some require a large force. In either case, however, the ejection force must be properly distributed over the surface area of the die casting. The ejection force has to be

*This extent is in itself dependent on: a) the shrinkage of the metal, and b) the temperature to which the die casting drops before it is ejected.

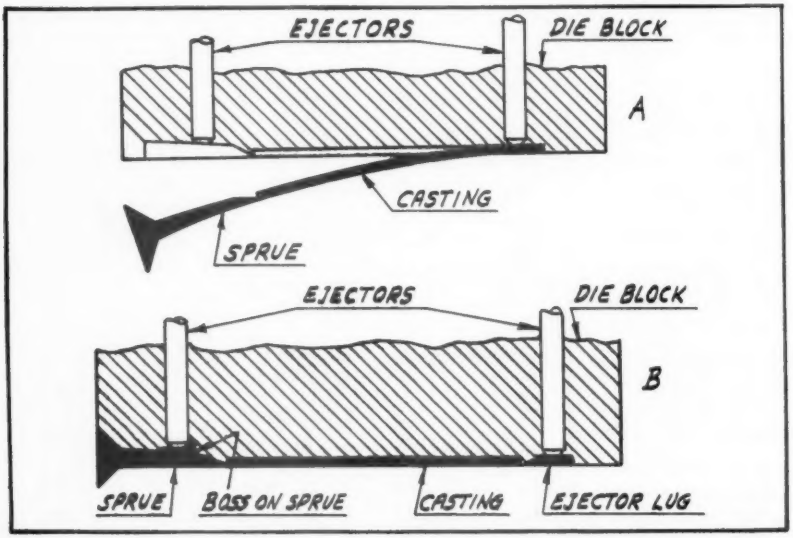


Fig. 3. Proper location of ejector pins avoids the damaging binding and distortion of a thin casting. "A" shows incorrect locating. "B" shows correct location of pins plus correct casting design providing an ejector lug or pad.

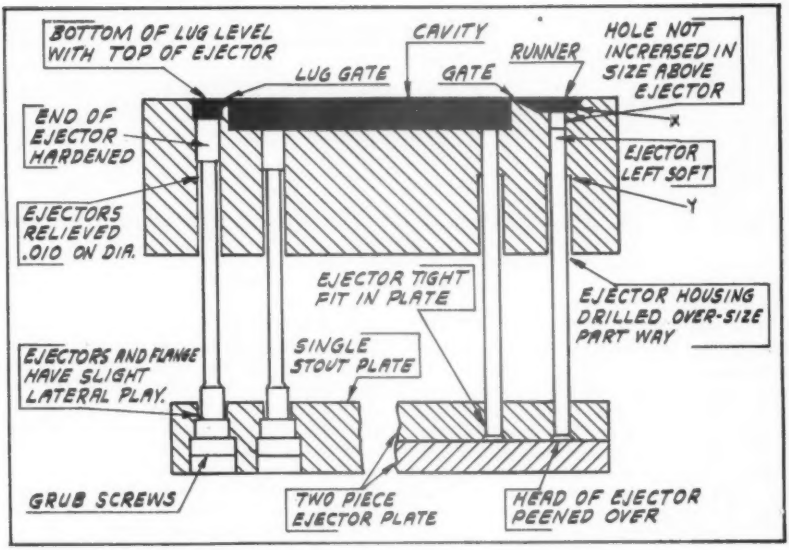

BOTTOM OF LUG LEVEL WITH TOP OF EJECTOR
CAVITY
RUNNER
HOLE NOT INCREASED IN SIZE ABOVE EJECTOR
LUG GATE
GATE
END OF EJECTOR HARDENED
EJECTOR LEFT SOFT
EJECTORS RELIEVED .010 ON DIA.
EJECTOR TIGHT FIT IN PLATE
EJECTOR HOUSING DRILLED OVER-SIZE PART WAY
EJECTORS AND FLANGE HAVE SLIGHT LATERAL PLAY.
SINGLE STOUT PLATE
GRUB SCREWS
TWO PIECE EJECTOR PLATE
HEAD OF EJECTOR PEENED OVER

Fig. 4. Correct (left) and incorrect (right) design of ejector pins incorporated in high speed, automatic dies as used to die cast zinc base alloys.

evenly distributed because, even in the case where the ejection force required is small, if it is not properly distributed it may eject the casting unevenly and as a result bind it, Figure 3, and thereby distort it before it is free of the die cavity. This is particularly true regarding a die casting that is cast in a die cavity having deep, narrow recesses and also applies to very thin, flat castings. In such cases, ejection applied at one point only would cause immediate binding and distortion, Figure 3. In the case where the ejection force required is large, the force must be evenly distributed else the pins might be pushed clear through the walls of the hot die casting.

It is necessary to have the points at which the ejection force is applied adequately distributed, in the most advantageous locations, and of sufficient number. It is always best to have too many rather than too few ejector pins!

Each die casting die presents its own new problems; it must be studied carefully to assure a sufficient force of uniform distribution to eject the casting.

Not only is the placement of the ejector pins important, but their diameter, or their tip area, is equally so. It must be remembered that the total ejection force applied on a pin will be somewhat constant; therefore, the unit pressure at the point where it contacts the casting will vary in relation to the actual area contacting the casting. Small pins of insufficient number, as opposed to larger ones, tend to pierce the die casting due to the very high localized force at their contacting ends.

If the casting requires a large force to eject it, use large diameter pins of ⅛" or more in preference to small diameter pins. In general the larger the die casting and the greater its complexity, the larger are the required ejector pins. Other reasons for avoiding small ejector pins will be discussed later.

Design of Ejector Pins

Ejector pins must be correctly designed. Likewise, their method of mount-

(CONTINUED ON PAGE 84)

Fixtures
For Casting Qualification

Part II A Program For Casting Qualification*

by A. H. Blacker
Cleveland, Ohio

The first step in setting up a Casting Qualifying Program is to determine which castings are to be qualified. This can be done by investigating the dimensional results of the various machining operations performed to date on each particular casting. From this, the difficulties experienced in setting up the part in the machine fixture can be analyzed with the viewpoint of establishing locating points on the casting for ease of placement in the machining fixture without the uncertainty involved in manipulation and adjustment of the casting. Analysis should also be made of machine line rejects in order to determine the critical dimension points which are causing these rejections. The inspection department can assist in this analysis by describing in detail on the rejection form the exact location and variation of the dimensional error attributable to foundry practice which caused rejection of the part. Even after a definite casting qualifying program has been established, continued investigation and analysis will reveal other castings which should be added, and will also indicate improvements and additions to the qualifying technique of those castings being qualified. While these two types of investigation and analysis are not the only means of determining the need for qualifying castings, they will serve as a positive and convenient point for origin of the program. The experience of the inspection and assembly personnel will prove invaluable in the final decision regarding either the castings on which this process will be used or the critical areas to be related to the qualified points.

If, for example, line investigation showed that a boring operation was consistently off center in relation to its boss, it would be advantageous to qualify this part and establish rest spots on the casting which would locate the casting in the machine line in such a way as to insure a positive and accurate placement of the casting in the drill jig or holding fixture. If, for another example, analysis of rejection forms shows that a certain machined surface of a casting consistently failed to clean up, this would be a definite indication that a gaging operation should be performed in the qualifying fixture to check and adjust the relative location of this surface to assure sufficient machining stock.

Figure 1 shows a typical Scrap Analysis Report from which the decisions were made regarding the choice of castings to be included in the Qualifying Program. It will be noted in the case of part No. 117163 that twelve castings had entered machining operations before it was discovered that insufficient stock was available at the areas noted, six of which were scrapped because of insufficient stock on a milling surface. In the case of part No. 118690, twelve castings were

**Part I—The Case For Casting Qualification: TOOL & DIE JOURNAL, October 1947.*

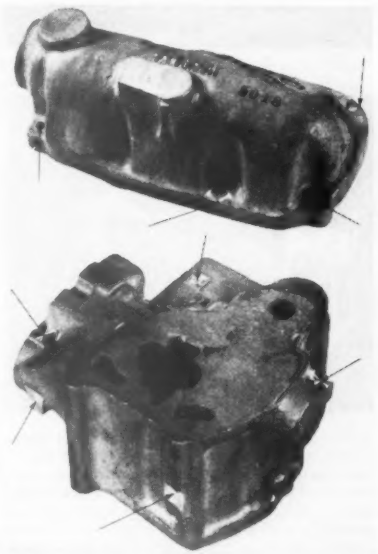
CASTING SCRAP ANALYSIS REPORT
For month of January, 1945

3

Cast. No.	Name	Scrap Charg. Mach. Shop	Scrap Chargeable to Foundry								Total No. Insp.
			Mat. Defects	Miscellaneous		Scrap Due to Foundry Dimensional Defects					
				No.	Description	Charge Dept.	Scrapped In Mach.	Scrapped In Fndy.	Description - For Casting Qualifying Analysis	Last Oper.	
117163	Sump - Oil*	48	146	15	Weld	808	1		Ins. stock	85	1794
				5	Mutilated	807		4	Thin Wall	130	
				5	Crack	807		2	Thin Wall	180	
				24	Misrun	807		7	Thin Wall	300	
				1	No heat no.	808	2		Thin Wall	150	
				2	No melt no.	808	1		Ins. stock mag. pad	20	
						535	2		Ins. stock tap. at oval hole	Final	
						808	1		Ins. stock 1.2495 - 1.2505 face	190	
						808	6		Ins. stock large mill. pad	20	
117326	Plate - Inp. Shroud #	1	1	5	Crack						10
117415	Sump - Oil*	2	5	1	Mutilated	808		2	No qualifying pad.	300	378
118690	Cover-Super Rear *	19	40	1	Weld	807		3	Ins. stock	300	3136
				1	Core missing	808	1		Thin wall at tube hole	Final	
				6	Mutilated	808	1		Ins. stock starter pad	560	
				5	Crack	808	1		Ins. stock front flange	560	
				2	Experiment	808	2		Ins. stock l. mag. side boss	560	
						808	4		Thin wall bet. scav. & oil	Final	
						808	1		Ins. stock r. face flange	560	
						808	1		Thin wall bet. scav. & gas.	70	
						808	1		Thin wall at Gusc	980	
126598	Mag.-Super. Front * #	4	104	1	Crack	808	1		Thin wall rear boss	Final	583
				4	No melt no.	807		2	Ins. stock	300	

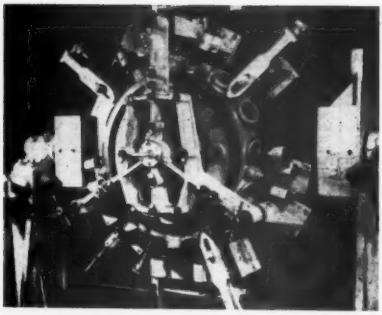
Fig. 1. The Scrap Analysis Report is used in determining which castings to include in the qualifying program.

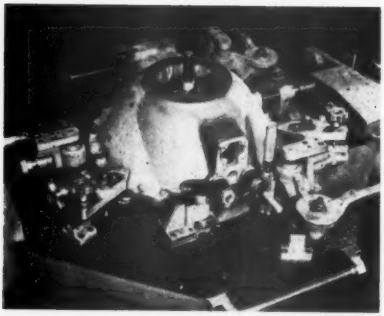
Fig. 2. Two examples of smaller castings after performance of qualifying operations.



charged back to the foundry after being machined, five of which were scrapped after the final operation. (This is the same casting which was shown being qualified in Example C of the first installment of this article, and figures were shown of the resultant saving after qualification was begun.) The machining time alone on this casting is 426.50 minutes, and even without the other expenses involved, casting qualification would have been a great saving in this instance.

After determining which castings are to be qualified, the next step is the design and procurement of Qualifying Fixtures. These fixtures are designed to hold the rough casting at points which are constant. The casting is then shifted in such a manner that the dimensional variations of the castings are equalized by comparison or matching with critically located targets on the fixture. When the casting is adjusted in the fixture so that sufficient stock is maintained





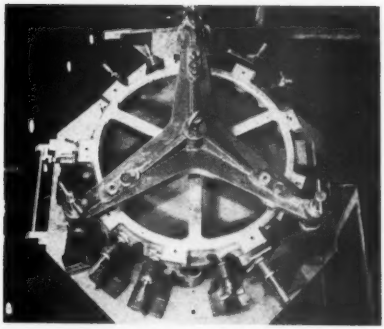


Fig. 3. Three different castings shown mounted in their targeted positions in qualifying fixtures. The locating and targeting operations are performed while the fixtures are in a horizontal position, while the actual qualifying machining operations are performed from the rear after the fixtures have been swung 90°, or to the vertical.

at all critical points to come within finished machining dimensions, locating spots and dowel holes are machined on the casting. The locations of these spots or holes are held to close tolerances by means of bushings built into the fixture which is constructed to gage-maker's tolerances to insure the maintenance of accuracy within both foundry and machining tolerances. These locating points are always in direct relation to the targets, so that when the casting is well targeted these locating spots will always fall at the exact relative spot on all castings. The qualifying fixtures should be simple in design yet include all components necessary to cover all critical areas on the casting. The fixtures for the smaller castings can be mobile, but the fixtures for the larger castings should be stationary, since in many cases hoists for handling the heavy castings must be mounted directly overhead.

In Figure 2 can be seen two examples of smaller castings after qualification, and Figure 3 shows three different castings in their targeted position in the qualifying fixture. In these instances, the qualifying machining is performed from the opposite side after the fixtures have been rotated ninety degrees. Note the different types of bushings and targets which have been utilized to relate the different critical areas around the bodies of these castings.

Whenever practical, casting qualifying fixtures are to be equipped with cutting tools powered by a detachable hand drill. Occasionally, it will be found practical to supplement foundry qualifying operations with hand tools by additional qualifying machining by standard machines in the machine shop, but this will be the exception and done only when such qualifying cannot be accomplished satisfactorily by hand tools.

In conjunction with the design of the qualifying fixture, the holding fixtures and drill jigs of the first affected machine line operations should be designed or altered to the same locating dimensions produced on the casting in the qualifying fixture. If machining has already been established on the particular part to be qualified, then attention must be given to scheduling the flow of castings from

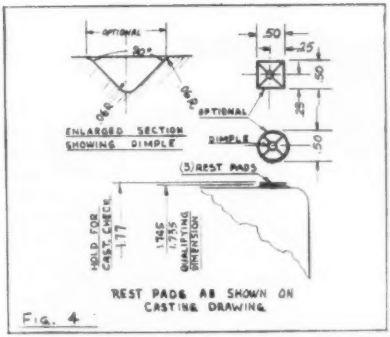
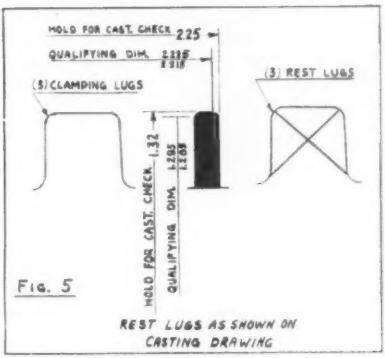


Fig. 4. (above) and Fig. 5 (below). The casting drawings must show the locations of all rest pads, check spots, locating pads, lugs, target, etc. Target areas, critical areas, tolerances and other pertinent data must be provided as a guide to tooling equipment design and processing operations.



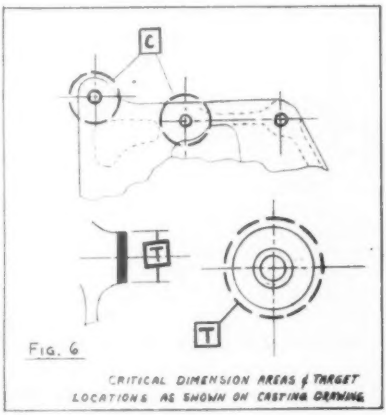
the foundry to finished stores in order that machine line shutdown for conversion of fixtures to run qualified castings will not interfere with the final assembly of the finished product.

The qualifying of castings can be performed in the foundry, or in another area set aside as the Casting Qualifying Area, and consists of inserting the casting in the fixture, targeting properly to equalize casting errors and stock, spot-facing the locating spots and drilling dowel holes as required by the casting qualifying drawing. A qualifying stamp should be placed on one of these locating points, such stamp to remain on the part until machining operations have been completed to such a point where any question of foundry practice would no longer be involved. If this stamp is removed or mutilated at any time during such machining operations, no rejections of the part can be charged back against the foundry as scrap, except for porosity or other material defect.

The qualifying of castings can be done most logically by Inspection Department personnel. Although it is necessary for machining operations to be performed, the qualifying process as a whole is definitely a process of inspection and is correctly assigned to the inspection department. It will be inspection's main objective to inspect and qualify the castings in such a manner that any and all approved castings will pass through the complete machining line without encountering difficulties that can be attributed dimensionally to faulty casting technique. The object of casting qualifying is not to save castings at the qualifying operation, but to insure quality castings and uniformity of location for the machine line.

(CONTINUED ON PAGE 92)

Fig. 6. Whether targets should be shown on a front or side view drawing depends upon which view presents the information more clearly. Heavy broken lines should encircle the target area and should be designated "T", as shown.



Abrasive Belt Machining For The Toolroom

In contrast to production runs, involving thousands of pieces, the toolroom is primarily concerned with performing machining operations in single pieces, each one differing from the next. Hence, the economies resulting from the use of special production machines, automatic loading and unloading devices and, in many instances, specially built jigs, do not accrue to the toolroom in the same proportion as to the production department. In spite of fast, modern machine tools expressly designed for toolroom use, machining operations until now were on a cut-by-cut basis, requiring holding devices and jigs for such simple operations as surfacing, generating radii, chamfering, squaring, etc.

Today, a method exists which will chamfer, round, square, form radii, grind flat, grind parallel surfaces, polish, and remove shaper marks; performing these eight operations in five minutes with the abrasive belt machining method, Figure 1.

In connection with Figure 1, it is pertinent to state that no special jigs or fixtures were used, only a simple angle plate and an oscillating feed table. Several operations were performed freehand, similar to the operation in Figure 2, except that in this particular model, the oscillating table is not shown. Before enlarging further on the application of abrasive belt machining in the toolroom, it might be well to dispose of the fundamentals of this machining method.

by Harvey L. Ramsay

Vice-President
Porter-Cable Machine Company
Syracuse, New York

Principles of Abrasive Belt Machining

Abrasive belt machining is a method of grinding, surfacing and stock removal through the cutting action of an abrasive belt traveling at a speed of from 2,500 to 4,500 surface feet per minute. A continuous abrasive belt travels over a top idler pulley and under a bottom drive pulley. Midway between the pulleys it slides past a hardened steel platen; the abrasive side is out, while the back of the belt contacts the platen. Against this platen the surfacing, grinding or stock removal operation takes place.

Located at the bottom part of the platen is the work table, on which jigs and fixtures can be constructed.

From the diagram, Figure 3, we note that the force of the belt is down; thus, when work is held against the belt, and supported on the table, there is no danger of work sliding out of hand, or requiring any exertion to hold it in place. The downward thrust is counteracted by the table. In simple surfacing operations, the "in" pressure of the work against the belt can be performed freehanded, that is, merely by pressing the work against the belt. On larger pieces, or on pieces where accuracy is important, or parallelism is to be achieved, a simple angle plate is used, as illustrated in Figure 3.

A coolant, if wet grinding is desired, is supplied by a spray nozzle, located directly above the work at the point where work contact is effected. Work and belt are constantly cool, and danger of distortion, warping or destruction of the structure of some materials is eliminated. Another spray nozzle, located inside the machine, near the bottom, constantly flushes out chips and cleans the

Fig. 1. This workpiece, on which eight different operations were performed, is tool steel, measuring 1¼" x 1¾" x ⅝". All eight operations were performed in five minutes.

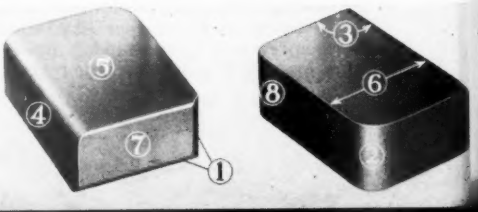


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Fig. 2. The operator of this abrasive belt surfacer is beveling a part, free-hand. Once a flat registering surface has been established, all ends are surfaced mutually square.

belt so that a clean surface is constantly presented to the work.

The Abrasive Belt

The modern abrasive belt bears no affinity to old-style belts. Today's abrasive belt is resistant to water and soluble oil and is of cloth backing, with the abrasive plastic-bonded to the belt. The grits are scientifically bonded to the belt by the electrostatic method in such a manner that the bases of the grits are embedded in the backing while the sharp ends of the grits protrude for continual cutting; further, extreme rigidity of the particles results, thus minimizing danger of grits tearing off.

Grits commonly used are aluminum oxide and silicon carbide, which are used in grinding wheels. Aluminum oxide grits are hard and sharp; while neither as hard nor as sharp as silicon carbide, they are not as brittle as silicon, and will perform better when grinding materials of high tensile strength such as carbon and alloy steels, soft and malleable and wrought iron, bronzes, etc. Silicon carbide belts are used on materials of lower tensile strength: cast iron, brass, aluminum and copper, and such non-metallic materials as rubber, plastics, ceramics, etc.

Grits are distributed evenly across the surface of the belt, thus obviating the dangers resulting from bumps and valleys, and also assuring greater accuracy.

Automatic Feed Table

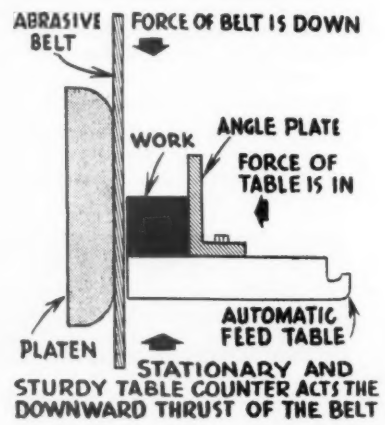
On many operations it is desirable to substitute mechanical pressure for hand pressure, especially when considerable amount of stock is to be removed, or a piece is to be surfaced to specified dimensions. With an automatic feed table, obtainable for the larger models of abrasive belt machines, tolerances of .001" are held with ease. Some users report holding tolerances to .0005".

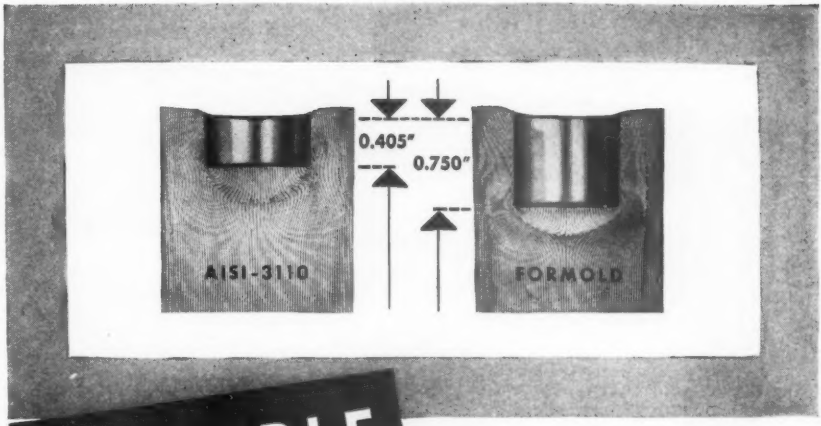
With the automatic feed table a pressure of 450 pounds can be exerted against the belt. The amount of pressure exerted on a given piece of work is dependent on the material to be surfaced, the area of the workface, and the amount of stock to be removed.

The table is equipped with a hydraulic control for controlling rate of feed of the work against the belt. A micrometer stop fixes the point at which the hydraulic control should cease operating when the belt has removed the desired amount of stock.

(CONTINUED ON PAGE 78)

Fig. 3. A schematic setup illustrating the principle of abrasive belt machining. The diagram is purposely out of proportion in order to emphasize functional features. All belt surfacers incorporate these basic principles.





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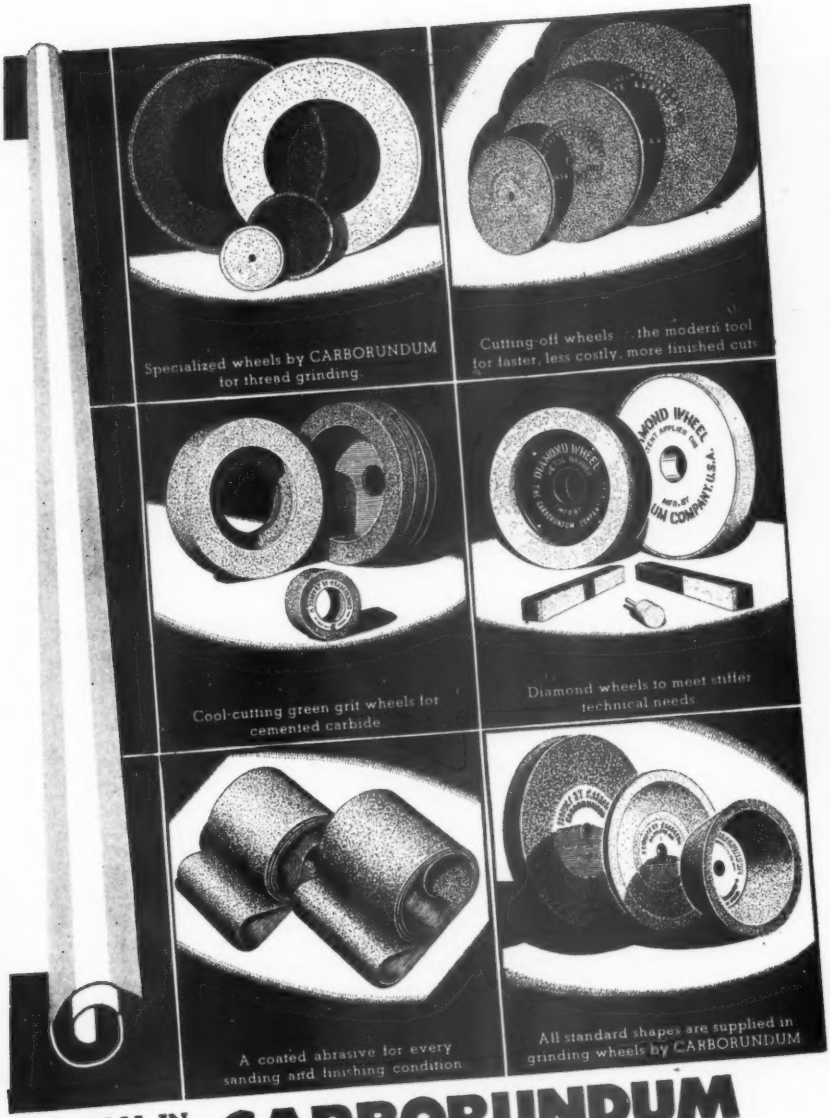
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Timken Purchases Plant

All construction on the new $150,000 rock bit plant at the eight-acre site, Colorado Springs, Colo., originally scheduled to be built by the Colorado Springs Chamber of Commerce and leased to The Timken Roller Bearing Co., Canton, Ohio, has been taken over by Timken, according to Mr. A. L. Bergstrom, vice-president in charge of engineering.

It was announced simultaneously that Mr. Frank M. Given, general foreman of the company's Mount Vernon plant, was named manager of the new unit. The final construction work, installation of machinery and getting the plant into production is under the advisory supervision of William A. Fowler, general manager of the Columbus plants, and was expected to be completed in December, 1947.

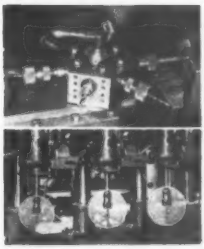
A daily output of some 10,000 rock bits a day has been scheduled and about 75 persons will be employed at the start.

Three Colorado Springs men, Francis R. Schmid, Jr., Dan H. Cameron and Milford R. Link, recently entered an intensive training course at the Mount Vernon plant in preparation for supervisory positions in the new Colorado Springs unit.

★ ★ ★

Name And Location Change

A new name and location for the H & M Machining & Engineering Co., Cleveland, Ohio, has been announced by Mr. A. O. Bates, president of the company. The firm's name has been changed to Lincoln Products, Inc., and its newly completed office and plant is at 1930 West 77th St. Mr. Bates, formerly plant manager of The Parker Appliance Co., and later president of Rosenberry & Bates, Management Consulting firm, states that Lincoln Products designs and manufactures special machines, tools, jigs and fixtures. Specialty jobbing, manufacturing aircraft and industrial parts, both experimentally and by production, are also part of Lincoln Products' activities.



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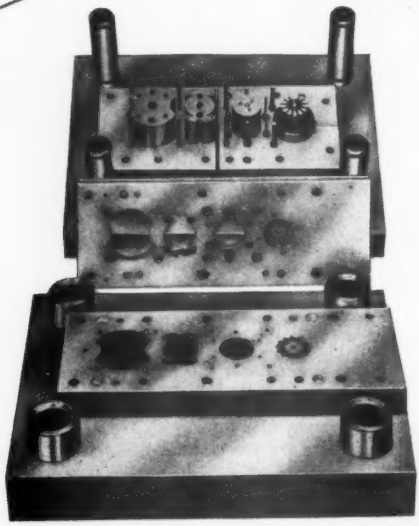

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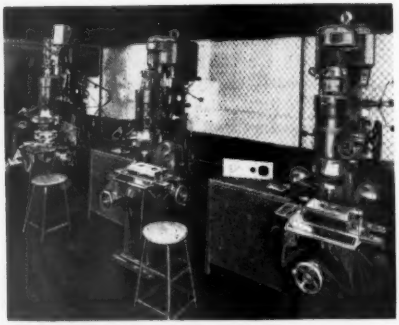

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To determine the qualities of drilled holes and the drilling properties of a molded plastics material, the following factors must be considered:

1. Type of drill
2. Angle of the cutting edge
3. Type of material and its properties
4. Peripheral speed
5. Feeding method (manual or mechanical)
6. Cooling agent

In order that the above factors can be determined for a specific drilling application, it is desirable that a method be devised for testing each of the factors on a high production basis. Only then can there be complete confidence in the selection of the drill, its running speed and cooling agent for the material specified.

We shall describe below a sample test used for the selection of the proper drilling equipment for the machining of standard, general-purpose phenolic materials.

> NOTE: Phenolic plastics are of the thermosetting type, which means they undergo physical and chemical changes under the influence of heat and pressure and become permanently insoluble and infusible.

TEST CONDITIONS: Because of the non-dependability and consequent inaccuracy of the human element in the manual operation of the drill press spindle feed (varying speeds and pressures), a standard type drill press was equipped with a mechanical feeding device. This device consisted of a motor-driven cam which caused the reciprocating motion of the spindle to operate at a constant speed and pressure. Thus, sufficient time was allowed between strokes for the operator to change the workpiece to a new drilling position. This also permitted the operator the use of both hands to manipulate the work which resulted in continuous drilling at a constant rate of speed.

FACTORS TO BE STUDIED: 1. The differences in technique necessary for drilling through-type holes as compared with drilling blind holes.

   a. Through-type holes are more difficult to drill because of the possibility of chipping around the back of the hole. Consequently, only 25% as many through holes can be produced per unit of time as blind holes. This production factor, of course, is dependent on the various influencing factors illustrated in the Test Table below.
   b. Blind-type holes are easily and rapidly drilled. A fast helix drill (small helix angle) is most suitable for this type drilling operation.

2. Color of drill
3. Friction and overheating
4. Drill angle
5. Speed in feet per minute

TESTING MATERIAL: Standard general-purpose phenolic material molded in a 4″ diameter disc $\frac{1}{8}$″ thick.

TYPE OF DRILL: Regular stock $\frac{1}{8}$″ diameter, steep fluted, high-speed drills were used. These drills were ground to the included angles of 118°, 90° and 60°, respectively.

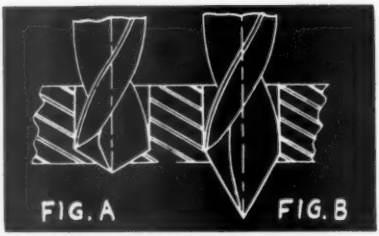
TEST CONDUCTED: Test 1: Drills, included angles of 118°, 90° and 60°, respectively, were operated at a speed of 138 ft per min (without air blast).
Test 2: Drills, included angles of 118°, 90° and 60°, respectively, were operated at a speed of 75 ft per min (without air blast).
Test 3: Same as Test 1, *with* air blast.
Test 4: Same as Test 2, *with* air blast.
Test 5: Drill, included angle 118°, was operated at a speed of 256 ft per min (without air blast).
Test 6: Same as Test 5, *with* air blast.

RESULTS: See diagram below.

GENERAL CONCLUSIONS: 1. *Drill color check:*
Test 1: All three drills—light yellow for approximately ½".
Test 2: All three drills—light straw for approximately ½".
Test 3: All three drills—light straw.
Test 4: All three drills—no change from original color.
Test 5: All three drills—burned blue.
Test 6: All three drills—burned blue.
NOTE: In Test 4 the drills remained cool during the entire drilling test.

2. There is an increase of 200 to 300% in drilling production by the use of an air blast concentrated on the drill in a position which will cause the air travel to terminate at the point of the drill.

3. Drills ground to 60° included angle are definitely superior, especially when drilling the through-type holes. Although these drills increase the power requirements, the feeding pressure is reduced. This allows the tool to drill through the material with a minimum of chipping. The two primary factors to be considered in material chipping are (1) the spindle feeding pressure and (2) the remaining area of material at the moment of the drill's break-through. For example, Figure A, above, illustrates a 118° drill and Figure B a 60° drill.



Since the drill in Figure A requires greater feeding pressure and since its cutting edges are in contact with a greater area of material during break-through, there is an increased tendency for the slivers of remaining material to chip off as the lip of the drill finally breaks through.

4. Reducing the friction between the drill and the material by grinding the drill off center (which results in a slightly larger hole) will often prolong the life of the drill. Friction causes the drill to overheat, particularly when used on phenolic materials. This is because of the inability of phenolics to dissipate heat.

5. A speed of approximately 75 ft per min is best for drilling phenolics.

6. In some cases better results are produced by using hard chrome-plated tools.

7. For high production work, mechanical feeds and carbide-tipped tools are recommended, especially on materials with a highly abrasive filler content.

We wish to thank Durez Plastics & Chemicals, Inc., for the material presented in this data sheet.

TEST TABLE	WITHOUT AIR BLAST							WITH AIR BLAST						
TEST	1			2			5	3			4			6
SPEED FT. PER MINUTE	138	138	138	75	75	75	256	138	138	138	75	75	75	256
DRILL ANGLE	118°	90°	60°	118°	90°	60°	118°	118°	90°	60°	118°	90°	60°	118°
THROUGH HOLES CHIPPED AT	52	58	83	56	59	102	3	54	60	96	68	72	202	13
BLIND HOLES DRILL READY FOR RESHARPENING	77	94	145	89	115	224	7	231	343	420	247	396	537	31

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Plastic Tooling Comes Of Age*

Part I

High strength, low pressure molded, reinforced plastic laminates have been adopted as standard, in lieu of steel, in many types of aircraft fabricating tools as a result of their proved economy, stability and durability. Mr. Wittman discusses material characteristics, design considerations and adaptability to tooling in other industries. Additional possible applications, based on present techniques and future development, are also outlined.

Plastic tools in the form of low pressure molded—"cooked" to order—high strength laminates have been proved to possess a high degree of accuracy, stability, durability and permanency. The simplicity inherent in this method of producing a large class of tools results in substantially lowered tool costs and the greater utilization of unskilled personnel. In addition to economies achieved in tooling for full-scale production it is now possible to overcome the obstacle of limited budgets and thus provide good tooling for short-run operations.

Lawrence Wittman
Tool Development Engineer
Republic Aviation Corporation
Farmingdale, New York

Primarily, molded laminate tooling was developed for use in aircraft manufacturing but it is by no means limited to that industry nor to sheet metal manufacturing alone. This system is applicable wherever special or project tooling is used to form, fabricate, check or hold components in position for various operations during the manufacturing process. This will especially hold true wherever such tools must incorporate complex shapes or contours.

Furthermore, it is now practical to produce consistently any number of duplicates of a tool which possess accuracy hitherto virtually impossible to attain with steel tooling. This feature will be of significance in dispersed plant operations requiring close coordination of tooling and where production volume necessitates duplicate tooling.

Obviously, the complete roster of tool types which can be satisfactorily handled with molded laminates will be available only after imagination and "know how" have been applied to the tooling problems of many industries. At present, one can point to successful, proved uses and later in this paper indicate additional immediate and future possibilities.

Included among the types of contoured fabricating tools now made exclusively of glass laminate at Republic Aviation are the following: checking fixtures, routing fixtures, drill jigs (drill nests, cages, bases), assembly, spot-weld and installation fixtures. In addition, special tools, not in the category of jigs

Contributed by the Rubber and Plastics Division for presentation at the annual meeting of The American Society of Mechanical Engineers, Atlantic City, New Jersey, December 1-5, 1947.

Fig. 1. Representative small contoured tools. Center item shows tool with molded backing and flat base. This method is adaptable to milling fixture design. Note molded pad on clamp.

and fixtures, have been economically fabricated in this medium. Although these standard applications have been fully described in a previous paper (1)*, it is pertinent to mention and illustrate some of the more significant features.

Because of the light weight and relatively thin cross-section, tool size, either small or large, does not impose any limitation on the use of the molding process. Some fairly small tools are shown in Figures 1 and 2 while the assembly fixture of Figure 3 is an example of a large tool. The contoured base of this fixture is a single molding approximately 10 feet long but it is by no means representative of the largest practical molding. The upper limit is determined by the facilities available—principally the size of the oven.

Where tool portability is required, the low weight of laminates becomes an important attribute. The routing fixture in Figure 4 illustrates this point. When such fixtures were made of steel it was generally necessary to mount them on fixed bases and resort to less efficient hand routing methods.

There is, of course, no panacea for all tooling problems but, when wisely applied, molded laminates can be made an effective adjunct to, or improvement over, existing methods. The expansion of the application possibilities to a great variety of tooling depends upon a reorientation of the tooling man's thinking, at least to the extent of his admitting the possibility that other materials may serve as well or better than steel. The demonstration that such is actually the case is the partial objective of this paper along with discussion of design considerations, performance data and trend of further development.

The general industrial interest attendant to the disclosure of details regarding this method of tooling (1) has further indicated the need for a broader treatment of the mechanical and other aspects of the process together with added definition of its field of utility. In order to provide a basis for better understanding of the subject it is deemed worthwhile to briefly review the historical background of this development.

Plastic Tooling History

Scarcity of metals and skilled toolmakers in the early war years was re-

*Numbers in parentheses refer to similarly numbered references in bibliography.

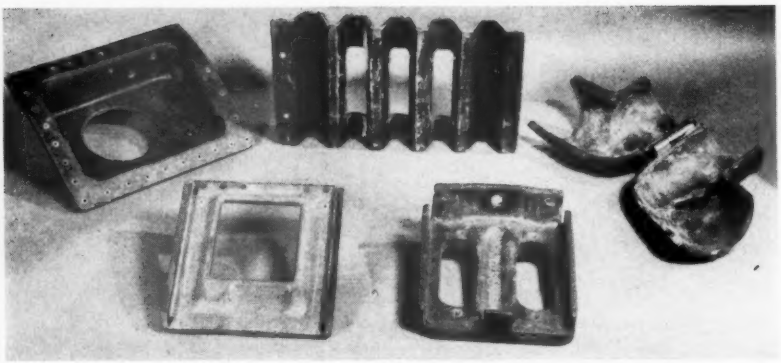
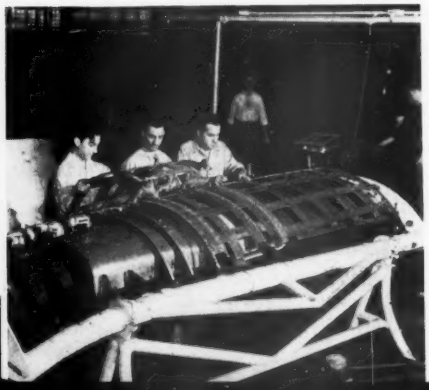


Fig. 2. Examples of complex shapes easily produced in molded laminates.

sponsible for the initial efforts to find substitute materials which could be worked with less manpower and lower-grade skills. Later on, at the author's plant, and in the discussions of the Plastic Tooling Research Panel of the Aircraft War Production Council, East Coast, the problem of scarce metal substitution became secondary to that of finding materials and methods which would permit simplification of tool manufacture. The emphasis was, and still is, on reduction of manufacturing time and lessening of requirements for and dependence upon highly skilled operators.

Of the many types of materials tested and used a few have found a place in the postwar economy. Among these are flat sheet phenolic laminates, used in certain types of forming tools, jigs and fixtures; and lignin-type sheets such as Masonite, for temporary forming tools and other miscellaneous tooling uses.

Fig. 3. A fairly large assembly fixture shown partially loaded. Visible at extreme left is the base molding which runs entire length of fixture. Note demountable drill racks.



By far the greatest amount of attention and work was concentrated on cast plastic development. This was natural since the casting technique admirably satisfies the simplification requirements outlined above. During the early use of cast plastics, particularly liquid phenolics, the handling and curing was done largely on an empirical basis. It was believed that many of the deficiencies of cast plastics could be largely eliminated, or at least minimized, through proper handling and curing of the materials. To this end, the Plastic Tooling Panel proposed the test program (2) which ultimately showed that ". . . optimum properties for any given casting are only obtained under one set of casting conditions" and that the curing conditions have a decided effect on properties, dimensional stability and shrinkage of phenolic castings.

The combination of glass cloth with an asbestos-filled phenolic casting resin (3) represented an improvement over straight casting. However, it left much to be desired in the way of simple, clean handling, fast curing cycles and appli-

(CONTINUED ON PAGE 74)

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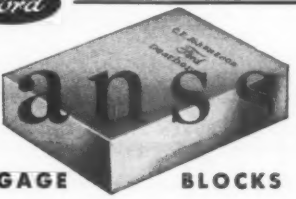

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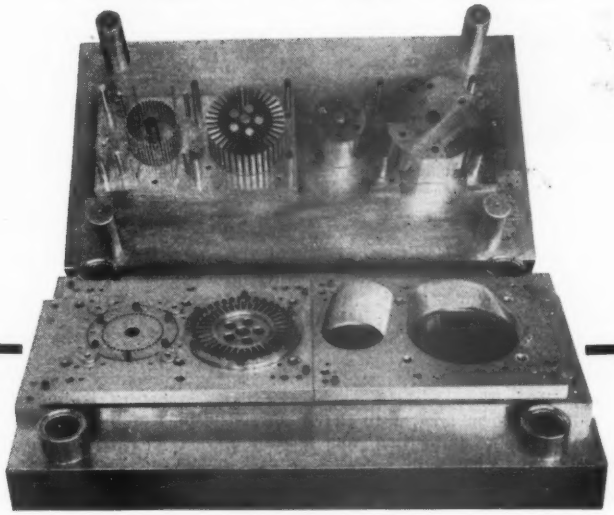

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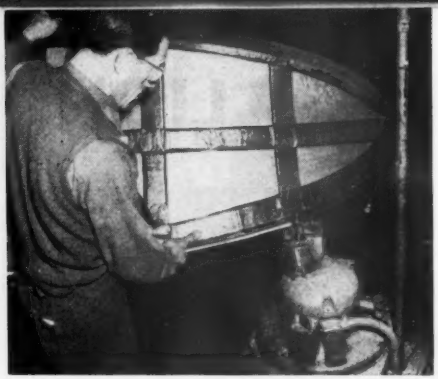


Fig. 4. The low weight of laminate tools is illustrated by this routing fixture which is over five feet long.

(CONTINUED FROM PAGE 70)
cability to a large variety and size of tools.

With the development of the fully thermosetting-type, low pressure resins, it became possible to utilize a relatively simple, fast technique which consistently produces a high strength product of uniform quality. Thus, molded laminates are today the best answer to the problem of tooling simplification and with it Plastic Tooling has come of age, ready for recognition as a full-fledged member of the tooling family on the basis of results proved in practice.

Molded Laminate Process

This process consists, in general, of modified adaptations of low pressure laminating techniques (4), (5), (6) and the development of practical procedures which consistently yield high quality results. The final products have become well known at Republic Aviation as "Molded Laminates" to distinguish them from commercial flat sheet phenolic laminates (such as Formica, Micarta, etc.) which are also used as tool materials.

To mold anything presupposes the use of a mold. In this case the mold can be very simple and relatively inexpensive. One type of mold often used is made by taking a sample part, preformed or shaped, and backing it with plaster or otherwise holding it in a rigid position. When a sample part is not available, or cannot be used, then a plaster mold is prepared either directly from templates or as a cast taken from a plaster model.

**Owens-Corning Fiberglas Corp.

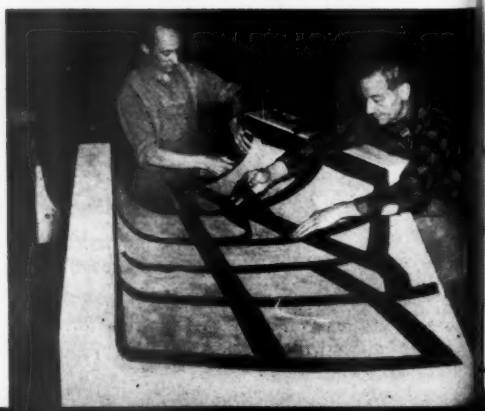
Multiple layers of resin impregnated glass cloth (generally Fiberglas** ECC-11-162 or 164) are applied over the mold as shown in Figure 5. After completing the layup, the mold is transferred to a portable molding table where a flexible vacuum bag, or blanket, is placed over it and the edges of the bag are fastened to the table to provide an airtight seal. Pressure, necessary only to hold the layers of cloth in good contact during cure in a hot air oven, is obtained by maintaining a vacuum of 20 to 28" mercury between the bag and the table. Total curing time at 250° F is not over 2 hours.

Evaluation of Molded Laminates

The principal economical advantage of this process is in molding the basic structure of a tool to shape and is derived from the simplicity and ease of molding compared to the difficulty and the time-consuming effort involved in fabricating conventional materials. Once the basic structure is molded and finished, the placement of steel drill guide bushings, clamps and other items requires no more time and skill than applying the same accessories to base structures made of steel.

In addition to the obvious economies, critical consideration was given to many questions which might possibly affect the successful large-scale use of molded laminates in tooling. Typical of these were the following: Is it stable and *rugged enough for permanent tooling?* What accuracy could be obtained? What are the costs compared to conventional steel tooling? Can alterations and repairs

Fig. 5. Typical use of impregnated cloth strips to build up fabricating tools. Note plaster mold.



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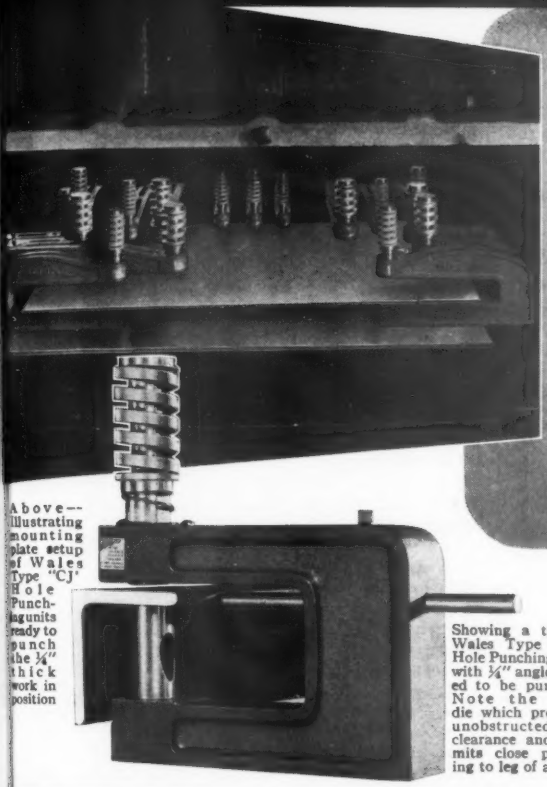

Above—Illustrating mounting plate setup of Wales Type "CJ" Hole Punch-ingunits ready to punch the ¼" thick work in position

Showing a typical Wales Type "CJ" Hole Punching Unit with ¼" angle nested to be punched. Note the high die which provides unobstructed slug clearance and permits close punching to leg of angles.

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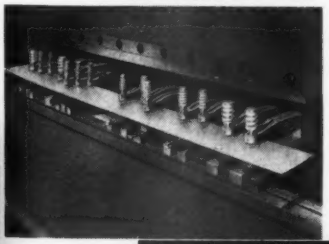

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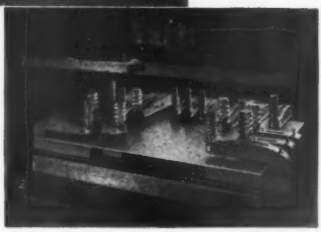
Showing a set-up Wales Type "CJ" Units in press brake for punching staggered holes. Note the ¼" thick work in position in the Units.

→

Showing Wales Type "CJ" Hole Punching Units mounted on a T-slotted plate in a stamping press with work ready to be punched.



**Note: Wales-Strippit Corporation has not granted permission to anyone to use this patented mounting method except with Wales Hole Punching and Notching Equipment.*

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be made easily? The answers, based on experience with over 1000 tools produced at Republic Aviation within the past two years, are hereinafter detailed.

STABILITY:—One of the principal requirements of any tooling material is dimensional stability. In a laminate this property is a function of the reinforcing material and the resins used. Glass fiber being of inorganic composition and non-cellular structure meets this requirement since it is unaffected by normal humidity changes. This is one of the reasons why all tools, to date, have been made of glass cloth. The various types of non-woven glass mats should be equally suitable from this point of view and their adoption is anticipated as soon as development is completed on methods of handling them in production.

The laminating resins, on the other hand, were subjected to greater scrutiny, in view of the previous experience with cast resins. The low pressure resins, because of their fully thermosetting nature and the absence of all volatiles, appeared to be free of adverse aging effects.

The two years' usage has proved this to be so, at least with respect to the resins employed at the author's plant, namely BCM† and Laminac‡. Since it is very likely that other resins in the same family will behave as well, it is possible to base the choice of resins on such other characteristics as handling properties, shelf life of impregnated cloth and over-all cost.

ACCURACY:—The most advantageous use of molded laminates is in the manufacture of tools involving complex shapes and contours. When these same tools are made of steel, good contour or shape is obtained only through the expenditure of considerable hand work or machining time. Accurate reproduction of contour, on the other hand, is inherent in this molding process, since no noticeable shrinkage occurs in curing laminates. This is probably due to the low resin-glass ratio of approximately 30% by volume.

The very minor amount of springback encountered in some moderately contoured shapes can be minimized by proper layup, controlled heating and cooling or readily overcome by simple external bracing. So far the last named methods have sufficed in those cases where even a small amount of initial distortion could not be tolerated.

The retention of accuracy is naturally just as important as initial accuracy. Since glass fibre, and hence glass-plastic laminates, have no definite yield point, it is possible to work the material very close to its ultimate strength without permanent deformation. Thus, the accuracy of the tools is not impaired should they be accidentally dropped or temporarily overloaded. Such occurrences have often been known to cause deformation of steel tools.

WEAR RESISTANCE AND RUGGEDNESS:—Again, the properties imparted to the laminate by the presence of glass cloth as the filler material made these tools long wearing and rugged. Actual usage and tests have both shown that edgewise wear, as in router guide templates, is less on molded laminates than on normalized cold rolled steel.

Many tools are not only subject to hard usage, but are often misused. Tools must be rugged to survive such treatment. Due principally to the high impact properties of molded laminates, practically no breakdowns have been recorded to date.

PERMANENCY:—The above outlined observations regarding stability, accuracy, wear resistance and ruggedness lead to the conclusion that molded laminates can be expected to have long tool life and for that reason can be classed as permanent tooling materials.

(TO BE CONTINUED)

†E. I. duPont deNemours & Co., Inc.
‡American Cyanamid Co.

Bibliography

1. *Better Tools from Molded Laminates; by Lawrence Wittman, Modern Plastics, Vol. 24, No. 10, pp. 132-137.*
2. *The Evaluation of Cast Plastics and Casting Processes; by James T. Gray, et al., Curtiss-Wright Airplane Division, Research Lab.—Photostat or Microfilm copies from Department of Commerce, Office of Technical Services; Report Nos.: PB27098 through PB27104.*
3. *Properties & Fabrication of Glass Reinforced Plastics; by J. Slayter and H. W. Collins, Materials & Methods, Vol. 22, No. 9.*
4. *Molding Low Pressure Laminates; Modern Plastics Encyclopedia, 1947, Vol. 1. pp. 603-607.*
5. *Structural Materials Made from Fiberglas Fabrics; by John Reeves, Textile World, Vol. 95, No. 10 (October 1945). pp. 110-112.*
6. *Plastic Laminates in Aircraft Tooling; Modern Plastics, Vol. 22, No. 6 (February 1945), pp. 136-137, 202.*

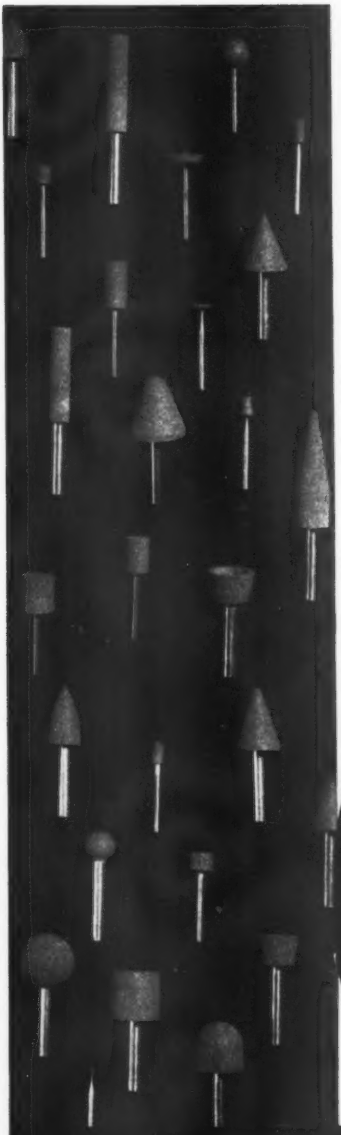

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Fig. 4. The simple jig used to surface gear covers and cases at the Easy Washing Machine Company. A gear case is seen at the left on the machine table. The jig is built on an automatic feed table which controls the rate of in-feed and the amount of stock removed.

(CONTINUED FROM PAGE 58)

Toolroom Applications

An abrasive belt surfacer is in use at the Modern Tool and Die Company, Los Angeles. At this company, the operator is cleaning up cast iron conveyor plates without the aid of fixtures, an operation similar to that shown in Figure 2. It is not difficult to imagine the time saved in the actual operation, nor the money saved because no fixtures had to be built. Burrs, fins, risers, flashings are removed in the same manner.

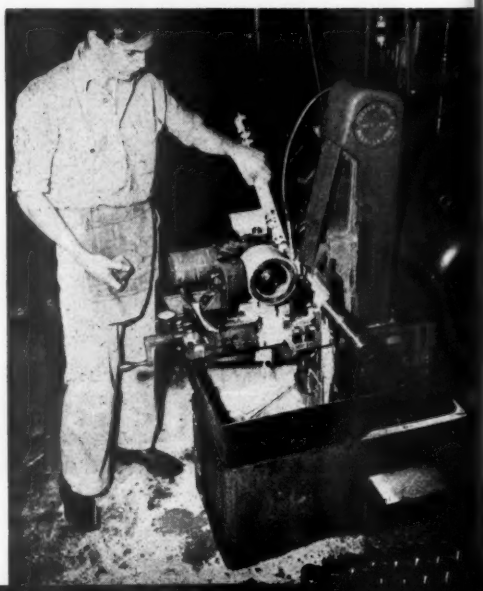
While Figure 4 is not of a toolroom application, it graphically illustrates the economy of abrasive belt machinery. (Inasmuch as the operation, viz., surfacing a dispersed area, is common to all toolrooms, it is here included.) The application was photographed at the Easy Washing Machine Company, Syracuse, N. Y. The parts are die cast aluminum gear cases and covers. A #80 grit belt was used at 4100 surface feet per minute, resulting in a production rate of 90 complete cases and covers per hour. The problem was to surface the edges flat and to remove flash. The boxes are 6" wide by 10" long by ½" thick, and are so finely surfaced that a .002" feeler cannot enter between the two halves. Belts last about two days.

Where a surfacing operation is to be performed in the toolroom, the work is simply held against the moving belt and grinding takes place. Large surfaces up to 16 square inches of workfaces are easily surfaced by this method as the platen is 9" wide on the larger models. The part area, rather than the workface area, increases if the part has a dispersed area. An entire area is surfaced all over in a few seconds without impairment to the finish; no chatter or tool marks, and no rounded corners at the edges of the workpiece result when the abrasive belt machining method is used.

Among other toolroom operations which are speeded, the following are now being performed by various users:

1. In making blanking dies, the die is made first, then the punch is accurately laid out and after roughly machining the punch, a surfacer is used to make the punch fit the die.
2. Before machining small fixture castings, one side is ground off the casting to make a flat, serving as a rest when machining. This speeds setups.
3. When making contours, the work is laid out, rough-sawed, or shaped,

Fig. 5. With this abrasive belt centerless grinder setup, the operator is finishing 2¼" tubes to a tolerance of .0005"; about .005" of stock being removed from each tube. The change from rough to finish grinding is effected in a matter of minutes, simply by changing from the coarse to a fine grit belt.



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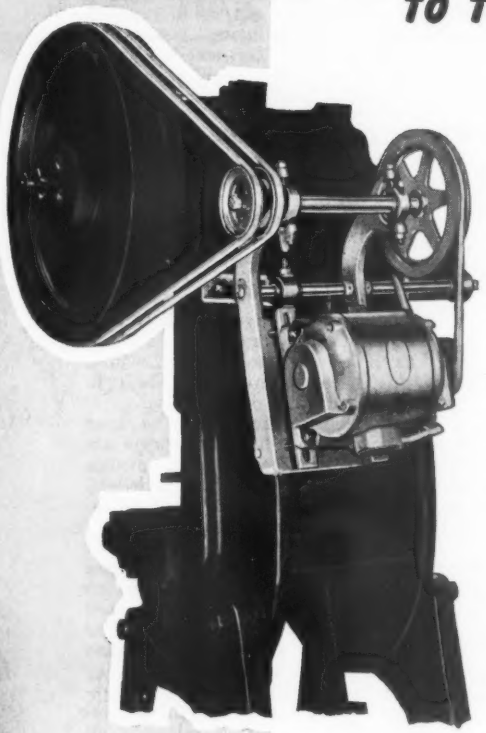

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then finished. Thus much hand filing and profiling is eliminated.

4. By cutting stock just a trifle longer than required, an abrasive belt surfacer quickly and accurately grinds to specified size.
5. Other applications: dies are sharpened; tool bits produced without change in temper; repairs to jigs and fixtures speeded, since parts can be shaped and sized quickly, free-hand, and without jigs and fixtures. It might be important to re-emphasize the adaptability of belt surfacing to free-hand surfacing. When jigs and fixtures are required, they are of simple design and easy to manufacture, as can be seen in Figure 4. This is an important saving in time and money when abrasive belt machining is used as a production tool, as it is in hundreds of plants.
6. Welds are easily surfaced.
7. An abrasive belt surfacer is ideal for cleaning up stock, shaping, generating contours, squaring, knocking off corners, burrs, sprues, fins, etc. Because the material is kept cool, due to the coolant which flushes the belt and work, the operator need not dunk the workpiece in order to hold it, nor is the analysis of the material disturbed.

Stock Removal

How much stock can be removed from a given piece of work? Manufacturers of belt surfacing machines cannot answer this due to the greatly varying factors which influence a surfacing operation, viz., material used, square area of the workface, tolerance to be held, etc. With the automatic feed table, substituting mechanical pressure for manual force, a maximum of ½" can be removed. However, while possible, the removal of such a large quantity of stock is unprofitable and would result in short belt life, increasing machining time and excessive material waste. On non-ferrous metals the removal of ⅛" or $\frac{1}{32}$" of stock is common; naturally, these figures vary for ferrous metals. The grinding time on the majority of operations is quite short; from 5 to 30 seconds is required to remove stock. On roughing operations, the removal of from ½ to 1 ounce of stock from a given workpiece is not uncommon.

Carbide Grinding

Considerable carbide grinding is being done by some users. A smaller model surfacer is used, utilizing a 150 grit silicon carbide belt. Kerosene is dripped onto the abrasive belt, thus preventing surface cracks and achieving a finer finish.

In a test run a cast iron contact was placed on the surfacer, using soluble oil with a 150 grit belt. Four carbide tipped tools were run. After grinding, the tools produced ten times the number of workpieces obtained when the tools were ground by other methods.

Summary

In this article we have dealt only with the highlights of abrasive belt machining, as it affects toolroom procedure. However, surfacers are in use daily in production and other departments.

An abrasive surfacer may be used wet or dry. Many different models are available for toolrooms; large models for heavy work and small belt grinders, attachable to any standard bench grinder, for small deburring operations.

Centerless grinders are available at extremely low cost. The centerless illustrated in Figure 5 performs on round stock as well as the standard machine performs on flat stock. The centerless grinds slightly out-of-round stock with ease because of the resiliency of the belts and wheels. The change-over from a roughing to a finishing operation is but a matter of minutes; all that needs to be done is to change belts.

Several types of platens against which the work is pressed are available. Perfectly flat platens are available for close tolerance work, while resilient platens are used for curved or contoured stock.

Countless uses exist for this machining method, to make it not only versatile but economical and fast as well. The speed with which pieces are surfaced, the low cost of fixture making, and the adaptability of this method to surfacing, grinding and stock removal operations make it an important tool in large and small manufacturing plants.

An Advertisement

THE TOOL & DIE INDUSTRY UNITES

Looking back 4 years—to the formation of the National Tool & Die Manufacturers Association—shop owners are now asking themselves, "Why didn't we get together sooner?"

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A better understanding between shop owners and customers is being developed

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Wage rates, paid vacation plans, etc., prevailing in 24 Tool Centers have been made available

The Business Trends Survey brings you a monthly picture of business nationally and by local areas

Both unionized and unorganized shops receive practical information on labor relations

Monthly News Letters provide interesting news of the Special Tooling Industry

Special Bulletins on topics of immediate importance to Tool and Die Manufacturers are frequent

Business and social contacts between shop owners at local and national meetings have proved beneficial

Why not write for further information on what the National is doing in your interest?

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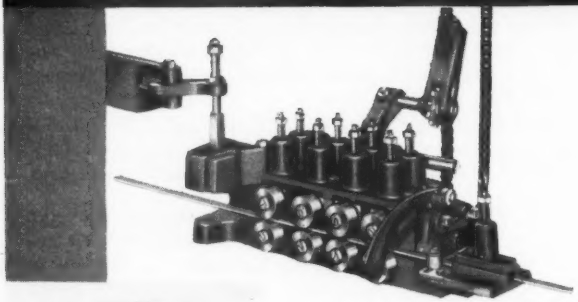

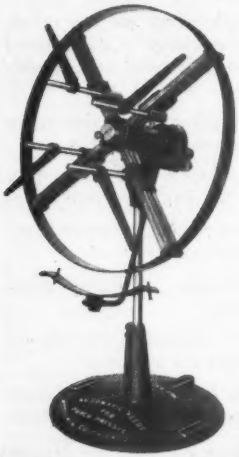

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TOOL & DIE JOURNAL

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Die Casting Die Design

(CONTINUED FROM PAGE 51)

ing on to the ejector plate and the holes in the die through which they pass must be properly designed. Improper design leads to failure of the pins. One such failure is seizure of the ejectors. This is by far the most common fault encountered in the operation of die casting dies, and it is responsible for much of the production downtime experienced in the contemporary die casting plant. Too little interest is taken in the reasons why ejectors fail and only too frequently replacement is taken as a matter of course.

The employment of properly designed ejectors will eliminate virtually the whole loss of production time from faulty and broken ejector pins. Despite this fact, however, many die casting shops still employ ejectors of obsolete design. For example, some die casters make their pins by upsetting or peening-over the end of a length of drill rod, and then they seat the ejector pin in the ejector plate in a slightly countersunk position, and add a retaining plate behind the ejector plate, Figure 4. Occasionally, as a refinement, they enlarge a portion of the die block housing of the ejector to a greater diameter than the ejector pin, but this is by no means universal. Figure 4 shows some ejector pins in their casting position; at the left is one type of correct design, and at the right an incorrect design. The enlargement of the ejector pin housing in the die block at the right of Figure 4 and at the back of the die block tends to reduce rubbing friction; however, the whole working length of the ejector pin has to pass through the zone x-y. This portion of the housing becomes, by reason of its contiguity to the cavity, excessively hot in a short time and lubricant carried along by the ejector pin tends to be scraped off as the latter returns to the casting position. Under normal die operating conditions, seizure in such a case can be only prevented by frequent and liberal applications of expensive carnauba wax or a graphite lubricant. On the modern automatic die casting machines now in general use, it is not possible to tell by the "feel" of the machine whether the ejector mechanism is working smoothly or not, and an error in judgment on the part of the operator as to the need for further lubrication can have only one result: failure of the ejector pins.

In the case of properly designed ejector pins, Figure 4, the housing of the ejector in the die block is a plain paralleled bore, lapped to size, and the ejector itself is reduced in diameter about half an inch from the working end. There is only the ejector plate and no retaining plate; this has counterbored seating to take the flange on the head of the ejectors, and the ejectors themselves are retained by two socket-head grub screws instead of by the retaining plate. In the case of this type of ejector there is contact between the head and the sides of its housing in the die block only during the first half inch of travel. Consequently, heat transfer is minimized and the working end of the ejector has a chance to cool off during the interval between ejection and the closure of the die. In addition, the flange at the rear end or head of the ejector pin makes it possible to allow a certain degree of lateral freedom needed to compensate for the unequal expansion of the die block and the ejector plate. This is something which is not possible when the head of the ejector pin is merely peened-over.

Occasionally, instead of employing two treaded grub screws, the ejector pin is provided with a collar; this collar is threaded and screwed onto the correspondingly threaded end of the ejector pin. In this case the protruding end of the ejector should be filed flush and the collar must be locked by a center-pop. The head of the ejector pin should be a slack fit in its seating and it will therefore have a slight degree of lateral freedom. The ejector pin should be backed up in this case with a second plate. Still another method is to provide a thread in the hole behind the head of the ejector pin and fit a socket-head grub screw. Such grub screws should have flat or half-dog

ends rather than cup or cone points, so that they do not bite into the heads of the threaded ejectors. The thicker single ejector plate used in this instance is considerably more rigid in operation than two separate ejector plates. And its use also allows any particular ejector pin to be removed or inserted without altering the setup of the remaining ejector pins.

The thermal expansion of the die block is quite different from that of the ejector plate; therefore, if ejector pins are rigidly secured they will tend to bear on one side of their housing in the die block through which they pass. When this happens they are particularly liable to galling or seizure. Some die casters try to remedy this situation by enlarging the housing hole and lengthening the ejector pins in order to spread the deflection over a greater length. In point of fact, however, either of these methods slows down the operation of the die casting die and increases ejector pin breakage. The method shown at left in Figure 4 is much sounder and, in the long run, much cheaper.

The working-end of the ejector pin, i.e., the end in contact with the casting, should always be hardened, and when used in dies to cast aluminum, they should be nitrided, as pins left in the soft condition readily seize. Even in a thick die, hardened pins will tend to seize unless the bearing surface within the ejector housing is reduced. Some die casters relieve the ejector housing in the die block by running a clearance drill in from the back of the die within about ¾ inch of the cavity, as shown at right of Figure 4. This procedure does allow lubricant to penetrate further along the ejector pin; however, the ejector pin is in contact with the housing in the die for the entire distance of its travel. The best method of relief is to relieve the ejector itself 0.010" or more, depending on its diameter, from a point about ½ to ¾ inch from its cavity tip on back to its head. In this case, after the first ½ or ¾ inch of travel the remainder of the ejector pin will be entirely free of the housing. Of course there is considerably more work

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involved in fabricating an ejector pin of this latter sort than there is in producing the older type of ejector pin; however, since breakage often can be reduced by 75% after the adoption of this design, the larger initial cost of preparing the ejector pin is more than justified by the end result.

It is sometimes necessary to sink ejector pins below the surface of the die cavity or runner cavity (more so in the case of the latter) so as to form an anchor which will hold the runner to the movable die half as well as to eject the entire casting uniformly. Ejector pins which must serve this dual purpose, if merely shortened, as shown at the right in Figure 4, will fail by seizure, and it will become necessary eventually to open up the housing holes through which the ejector pins pass to make way for larger ejector pins. The portion of the housing hole around the tip of the ejector pin not only becomes overheated, especially nearest the cavity, but it loses its lubricant at every shot.

To work successfully, pins of this type should have their housing holes counterbored level with the top of the ejector pin, as shown at the left in Figure 4. This holds good for ejector pins which contact lugs attached to the die casting.

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Allegheny Ludlum Purchases Plant

Allegheny Ludlum Steel Corp. has notified the WAA that it accepts its counter-proposal for sale to the company of Plancor 99, government-constructed steel plant operated by Allegheny Ludlum during the war in Dunkirk, N. Y. In making known that his company had accepted the WAA offer, Mr. H. G. Batcheller, company president, stated that, in addition to the purchase price of $1,500,000, his company would spend more than $500,000 in converting the plant for stainless steel wire production. He added that, when at capacity operation, more men will be employed at the plant than at any time during the war. Company officials hope to have the plant in operation in from 60 to 90 days.

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Glenny Broach Now Produced Exclusively

After thirty years of specialized manufacturing of precision parts for industry, The East Shore Machine Products Co., last August, disposed of its large investment in machinery for that need, but retained the modern plant that has been its home in Cleveland, Ohio, to manufacture the Glenny Broach.

Miss Nellie Gottschelt, daughter of the company's founder and present president and treasurer, has announced that efforts will now be devoted exclusively to the sale of the Glenny Adjustable Expansion Keyway Push Broach, a tool she introduced over ten years ago and which has been continuously manufactured by the company ever since.

The Glenny Broach, designed originally for the cutting of keyways in small quantities on an arbor press and which maintains ±.0005 tolerance on every piece broached, has become such a favorite with tool rooms and other factory departments that the company now produces only this Glenny Broach.

Request complete details and Catalog No. 10 from The East Shore Machine Products Co., Dept. 54, East 140 St. & Aspinwall Ave., Cleveland, Ohio, or use INFORM-A-GRAM Key No. D54.

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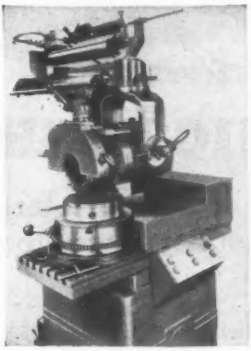
PMI Annual Meeting

In announcing the annual meeting of the Pressed Metal Institute to be held February 10 and 11, 1948, Hotel Statler, Buffalo, N. Y., Mr. Tom J. Smith, Jr., president of the Institute, simultaneously made public the appointment of Mr. Jerry Singleton, who has had more than twenty years' experience in contact work, as his assistant. The two-day meeting, as stated by Mr. Smith, will be devoted to reports of officers and committee chairmen, election of trustees and officers, and to four programs of special interest to management and stamping engineers. Mr. Sam Morrison, vice-president, Morrison Steel Products, Inc., Buffalo, N. Y., is chairman of the Annual Meeting Committee.



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ASTE Industrial Exposition

The latest announcement by the American Society of Tool Engineers on developments relating to the Sixth Annual ASTE Industrial Exposition indicates beyond any doubt that this Exposition will be the largest in the Society's history. The exposition will be held in Cleveland, March 15-19, 1948, coincident to the Society's Sixteenth Annual Meeting.

William Bradford Peirce, president of the ASTE, said that the large amount of exhibit space already sold is attributable to several factors: (1) the highly successful show the ASTE sponsored in April 1946; (2) the tremendous increase in ASTE membership since the 1946 Exposition, now standing at well over 18,000 and (3) that more than 225 firms have already contracted for more than 65% of the available space in Cleveland's Public Auditorium, largest suitable exhibit space in the United States.

The tentative program for the Exposition includes plant tours in the Cleveland area.

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Tools, Dies, Fixtures Built By Welding

The use of welding for making tools, dies, and fixtures which will, when properly applied, save man-hours, materials, and production delays, was the subject discussed by two General Electric men, Mr. E. H. Girardot and Mr. D. W. Puffer, at the recent Boston ASTE semi-annual meeting. Both speeches came under the general subject up for discussion, "Welding and The Tool Engineer". Mr. Girardot devoted his part of the talk to the tooling phase, while Mr. Puffer talked on the basic welding factors involved.

Tools, dies, and fixtures fabricated by welding—butt, resistance, gas, and arc—compare favorably with those assembled by other methods for several reasons, Mr. Girardot stated. They provide satisfactory accuracy relative to warpage and distortion; can provide a uniform, pleasing appearance; are lighter, yet of at least equal strength; can more readily be changed to suit part revisions; provide a greater flexibility in design; and they can often be produced in less time than those assembled by conventional methods, and at less cost.

One of the basic and important problems confronted in welding, Mr. Puffer said in his speech, is distortion. The first rule of control, probably the most abused of all the rules for controlling distortion, is that the fabricator should have all parts properly designed for welding, the proper process selected, and a suitable procedure determined. The second control consists of suitable clamping of parts to be welded; the third, proper welding procedure with particular attention paid to sequence of welding and rate of heat input. The fourth control, and this is of the utmost importance because of the human safety factor, Mr. Puffer added, means qualified personnel judging the completed welds as to whether they meet design specifications. These four points, concluded Mr. Puffer, are essential for the effective use of welded construction.

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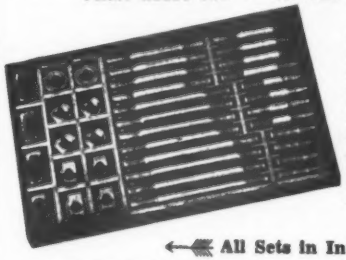

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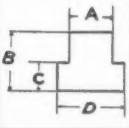

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NBA Obtains Fairchild Al-Fin License

Fairchild Engine and Airplane Corp., New York, has concluded a licensing agreement for use of its Al-Fin Process by the National Bronze and Aluminum Company of Cleveland, Ohio, according to an announcement by J. Carlton Ward, Jr., Fairchild president. This agreement permits NBA to use the process for bonding aluminum or its alloys to steel and iron.

The Al-Fin process makes possible the fabrication of bi-metallic assemblies combining the strength of steel with the light weight, high heat conductivity, excellent bearing properties, and anti-corrosion qualities of aluminum.

Mr. M. V. Little, sales manager of Al-Fin Division, stated that the Cleveland foundry intends to use the process in making bi-metallic pistons, steel-backed aluminum sleeve bearings and bushings, finned heat exchangers, finned convector heating units, and similar items.

A fact also pointed out by Mr. Little was that NBA's foundry, located in Cleveland near manufacturers having wide use for bi-metallic assemblies—particularly those in the automotive field—will result in better service and elimination of transportation delays.

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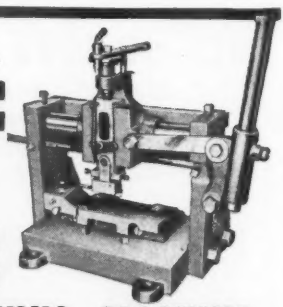

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Plant Changes Hands

The manufacture of the line of products—including Continuous Electrical Gages for Rolling Mills, Strip Mills, Paper Mills, etc.—of the Magnetic Gage Company of Akron, Ohio, has been taken over by Pratt & Whitney, Division Niles-Bement-Pond Company of West Hartford, Conn., according to an announcement from Pratt & Whitney. It is the intention of Pratt & Whitney to produce Magnetic Gage Products as a part of its own line but first, the company further stated, unfilled orders on the books of the Magnetic Gage Company will receive immediate attention. Operations will continue at the Akron plant until early 1948, at which time they will be moved to West Hartford.

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Vacuum Melting Of Metallic Alloys Data

Additional data on the vacuum melting of metallic alloys in Germany is contained in two reports released by the Office of Technical Services, Department of Commerce, Washington 25, D. C.

The first report (PB-79588; "Steel Production by Vacuum Electric Furnace at Heraeus Vacuumschmelze"; mimeographed, 25 cents, 6 pages) was compiled by Mr. Rheinhold Schempp, consultant to Ordnance Dept., U. S. Army, and discusses the vacuum melting of metallic alloys at the firm Heraeus Vaccumschmelze, Hanau, Germany. Mr. Schempp's report evaluates the Heraeus method and lists several observations based on his visit to the Heraeus plant. He also discusses briefly the firm's method of induction melting of an alloy of eight percent chrominum-aluminum.

More detailed information about German vacuum melting is contained in the second report by OTS investigator G. T. Motock. (PB-15196;; "Vacuum Melting of Metals in Germany"; photostat, $7; microfilm, $2; 92 pages.) This report describes the Heraeus plant layout, equipment in detail, and contains ten captured German drawings. Address orders payable to the Treasurer of the United States.

★ ★ ★

Public Relations Articles

A series of articles which appeared in the Syracuse press, on the purposes, policies and practices in relationships with employees, customers and community followed by Porter-Cable Machine Co., have been incorporated and published by them in a 22-page booklet. The scope of the articles shows how this firm approached employee relations and some of the methods used to establish and maintain this relationship on a firm foundation of mutual appreciation, trust and good will. Some interesting articles include: Inventory Time, Employment Security, Organized Friends, etc. Request a copy from Porter-Cable Machine Co., Syracuse, N. Y., or use INFORM-A-GRAM Key No. 14.

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(CONTINUED FROM PAGE 55)

Occasionally, castings will be found that have obviously been distorted or warped during heat-treatment and/or aging. These castings when encountered at the qualifying operations should not be qualified at that time. Such material should be segregated and properly tagged, stating conditions encountered, and submitted to the foundry or vendor as material which can be salvaged. Upon completion of necessary rework or reaging, they should again be sent through the qualifying operation.

A Master Casting should be provided for each part which is to be qualified. These master castings should be painted or otherwise distinguished and given a tool number. The casting should be accurately machined to the dimensions on the casting drawing, the ± .015" or ± .030" casting tolerance being added or subtracted according to the direction in which the targeting will take place. Or, castings can be laid out with scribed lines showing machined surfaces, such a master casting being as serviceable as a machined one. It should be the responsibility of the inspection unit performing the qualifying operation to see that these master castings are used periodically to check casting qualifying fixtures.

When originating qualifying procedure, prepared on which is shown all qualifya separate casting drawing should be ing data. No other casting data should be included, and these special drawings should be stamped "Casting Qualifying Drawing."

The original casting drawings will have to be revised to acquaint the Foundry, the Process and the Tool Design Departments with the requirements.

At this time, it may be necessary to redesign in order to include lugs or rest pads for the qualifying operation. The

Fig. 7. A form used in setting up qualifying procedure activities which details the steps to follow and which will hold changeover time to a minimum.

CINCINNATI

CASTING QUALIFYING

ACTIVITY CHART

Date SEP 1- 1944 Model R-2600-B

Checked

CAST. NO.	PART NO.	NAME	Largest Machine Standard	Actual Qualifying Time	Estimated Qualify. Time	Add. Qual. Fix. Req.	Shop Schedule For Rev. (As of date of this issue
69087	69087	Cover-Dual Acc.	2.75	3.7	4		2896
69089	69089	Hsg.-Dual Acc.	3.50	4.8	6		2702
69972	69972	Plate-Oil Pump	2.40	1.6	3		1513
110063	112531	Body-Oil Pump	5.50	8.5	12	1	1513
111779	111779	Hsg.-Fuel Pump	7.10		8		3039
112959	112959	Body-Oil Pump	5.00		10		2831
113206	113206	Cover-Oil Pump	2.15	1.6	3		1513
114725	114725	Cover-Oil Sump	25.05		4		1111
114450	114450	Body-Oil Pump	8.00		9		1038
114775	114775	C'Case-Fr.Sect.	7.93		7		1800
114803	114803	Body-Oil Pump	7.50		9		1176
115286	115286	Cover-Oil Pump	3.00	3.7	3		1513
115876	115876	Plate-Oil Pump	5.00	1.9	3		1513
116719	116719	Cover-Oil Sump	5.80		7		1038
117163	117163	Sump - Oil	8.50		8		1045
117415	117415	Sump - Oil	8.50		8		1304
118690	126584	Cover-Super.-R.	7.93		7		2040
118927	118927	Plate-Diffuser					
126598	128019	Hsg.-Super.-F.	7.93		8		2176
126918	128008	Hsg.-Super.-R.	8.29	12.1	7		2176

Bnk. B/P Change Proposal
Bnk. Prints Release & To
Prel.Inplant Meeting Held
Bnkd Prints Appvd.-Wkl.
Prelim. Schedule Review
Cast. Equip. Status Req.
Prod.Constr. Adjust.Order
Cast. Equip. Change Order
Tool Design Cards Issued
Casting B/P Available
Tool Design Released
Dual Tools Positioned
Dual. Tools Ordered
Memo to Special Process
Memo to Oper. Layout
Memo to Foundry Insp.
Carriers on Hand
Dual. Tools Received
Dual. Tools Demonstrated
Dual. Tools O.K.
Dual. Oper. Sheets Writ.
Final Scheduling Review
Final Meeting Held
Final Sched. Notification
Conv. Tool Cards Issued
Prod. Tool Conv. Complete
Cast Run Approved
Memo to Standards

No Activity Necessary ☒ Activity Since Last Issue ■ Activity Previous to Last Issue □

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casting drawings should be altered to show the location of all rest pads, check spots, locating pads, lugs, targets, etc. Target areas, critical areas, tolerances and other pertinent data should be shown as a guide to design of equipment and processing operations. Rest pads shown on casting drawings should be accompanied by a note to "Hold for Casting Checking." An instruction to the casting cleaning department "Rest Pads Are Not To Be Cleaned" should be incorporated on all drawings where rest pads are shown.

The lines used for the marking of rest pads should be slightly heavier than the outline of the part drawing and crossed through the center, with the note "Rest Pad" or "Rest Lug" pointing to the center of the pad. The projection of the pads in a side view is necessary to supply a means for using the "Hold for Casting Checking" dimensions. If the print does not show a suitable area for marking of pads or lugs, in side view, then a view should be added to give these dimensions clearly. The qualifying surface on the rest pad should be shown as a white line cutting through the pad and the dimension of this qualifying height should be marked as such. A dimple should be cast in the center of those rest pads which are to be qualified, eliminating the irregularity on the milled surface which would be caused by the center cutting action of the end mill. These functional details are shown in Figures 4 and 5.

Critical dimensional areas should be circled with a heavy dash line and designated "C", indicating special attention in targeting. The target dimensions on these areas, usually involving wall thickness, will be held to the low limit on internal contours in order that the operator may have better control in equalizing stock at critical points. Targets may be shown on a main view, or a side view of a casting drawing, the location depending upon which view presents the information more clearly. Heavy dash lines should be used to encircle the target area, not necessarily following the exact contour, and should be at least ⅛" away from the outline. Such areas should be designated "T", Figure 6.

Figure 7 shows the form used in setting up the qualifying procedure activities in the Cincinnati Plant of the Wright Aeronautical Corp. This shows at any time the status of the various steps required in the changeover to qualifying operations, some steps of which would be eliminated if the decision to use the process were made at the time planning were originated for a new part or product. If the above mentioned steps are followed in the order established in this procedure, changeover time will be held to a minimum.

The author realizes the impossibility of treating in so limited a space the many problems in procedure which will arise from the change to qualifying operations, especially where machining operations have been begun, but has attempted to outline those which are particularly related to this particular process. It cannot be too highly stressed that, despite the apparent cost of such processing, the rewards in saving of both time and material, and the gain in product quality will prove to be greater than such cost. The several advantages of casting qualification, namely: accurate and positive location of the casting in the first machining operations; elimination of the human element in the location of the casting in the machine line and the resultant saving in the skill required for these operations; correct control dimensionally of the foundry process; the actual saving in machining time which has been proven; the elimination of scrap after machining time has been expended on castings; and the noteworthy improvement in quality and appearance of the finished product. These factors add up to the conclusion that a new element in mass production has been definitely established.

The author wishes to acknowledge the courtesy of the Wright Aeronautical Corp. in allowing the use of the photographs of the qualifying process as set up in their wartime plant at Cincinnati, Ohio; and to acknowledge the aid and assistance of Mr. L. K. Cooksey, formerly of the Wright Corp., without whose records, knowledge, and experience in this program, these articles could not have been written.

GE Educational Program

Expansion of the General Electric Company, Schenectady, N. Y., coupled with the effects of the wartime shortage of graduates, led this year to selection of nearly twice the normal number of engineers, according to M. M. Boring, assistant to the vice-president in charge of engineering policy. More than 750 U. S. college and university students have been accepted for employment.

In addition, more than 100 graduates in Business Administration, Accounting and Liberal Arts have been selected from colleges and universities for training in accounting and financial work.

Most of the graduates accepted by the company for the technical courses have electrical or mechanical engineering degrees, but the number also includes chemical, aeronautical, and industrial engineers and physicists. New college-trained employees entering the GE $1,000,000-year education program will be included in technical, scientific, and business courses. This program also includes apprentice training for high school graduates.

★ ★ ★

Win Merit Awards

Developmental work of two employees of Allegheny Ludlum Steel Corporation, which has led to increased production in the steel and coal industries, has won them the company's Merit Award.

Glenn E. Hilliard was given his award for developing techniques for using oxygen as a carbon reduction agent in open hearth steelmaking. Under his direct supervision the process was first used commercially in America and it has led to increased production where oxygen, rather than ore, is used to reduce the carbon content of steel.

The award to Robert T. Eakin was based chiefly upon his work with Joy Mfg. Co. in the development of coal mining bits tipped with sintered carbide, thereby increasing production of machine-mined coal.

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Commercial And College Laboratories Listing

A complete listing of commercial and university testing and research laboratories throughout the country, together with indications of the type of commodities tested, has been compiled by the National Bureau of Standards. This pamphlet is now available from the Government Printing Office as NBS Miscellaneous Publication M187, entitled "Directory of Commercial and College Laboratories".

Information is given concerning 220 commercial laboratories, with 80 branches or offices, and 189 college laboratories used for research and testing as well as instruction. To facilitate the ready location of any laboratory, the listings are arranged both geographically and alphabetically. This directory will be of value to the large number of purchasers who are not equipped to make their own acceptance tests and have therefore hesitated to buy on specifications.

Miscellaneous Publication M187 may be obtained for 30 cents per copy from the Superintendent of Documents, Washington 25, D. C.

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SC & H Executives Retire

Mr. George J. Zimmerman, president of Strong, Carlisle & Hammond Co., Cleveland, Ohio since 1940 and manager of its Machinery Div. for more than a decade, retired Dec. 31, 1947, according to an announcement from the company. Mr. Harry H. Smith, manager of the Mac-it division of SC & H also retired on the same date.

★ ★ ★

Hy-Pro Announces Appointment

Mr. David D. Davis, vice-president of Hy-Pro Tool Co., New Bedford, Mass., manufacturers of High Speed Steel Commercial and Precision Ground Taps, announces the appointment of Mr. Walter M. Boyden as Sales Manager.

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Ceramics Research Paper

A general report of the accomplishments of the prominent German scientist, Dr. Eugene Ryschkewitch, in 20 years of extensive research in ceramics is now being offered by the Office of Technical Services, U. S. Dept. of Commerce. This information, which was obtained from the scientist by intelligence officers of the Army Air Forces at Wright Field, Dayton, Ohio, has been held confidential until now.

The report describes the scientists' basic research in the development of ceramic products from pure oxides, including the preparatory development of suitable high temperature furnaces for the purpose. Pure sintered alumina is a valuable material destined for frequent use in cases where progress is limited by present-day techniques and materials, Ryschkewitch asserts. Aluminum oxide is superior to all ceramic materials to date for pyrometer protection tubes while sintered corundum has become very important in the manufacture of insulators for heavy-duty spark plugs, especially in airplane engines.

Orders for the report, "General Survey of Work by Dr. Ryschkewitch," should be mailed to Office of Technical Services, Dept. of Commerce, Washington 25, D. C., accompanied by $1 check.

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Low-Cost Gage Blocks Holder

Expensive, individually made wooden boxes which formerly housed "Ultra-Chex" precision gage blocks, a product of George Scherr Co., Inc., New York, have been replaced with a new holder of molded Durez plastic. This new holder, in addition to lowering case costs, gives greater protection and longer service. The holder, produced in one short molding cycle with holes of the various sizes and identification markings molded in, has a round cavity with raised sides to hold the optical flat. A rectangular box with hinged top and snap-type locks complete the case. Details are available from Durez Plastics & Chemicals, Inc., Dept. 74, No. Tonawanda, N.Y., or use INFORM-A-GRAM Key No. B74.

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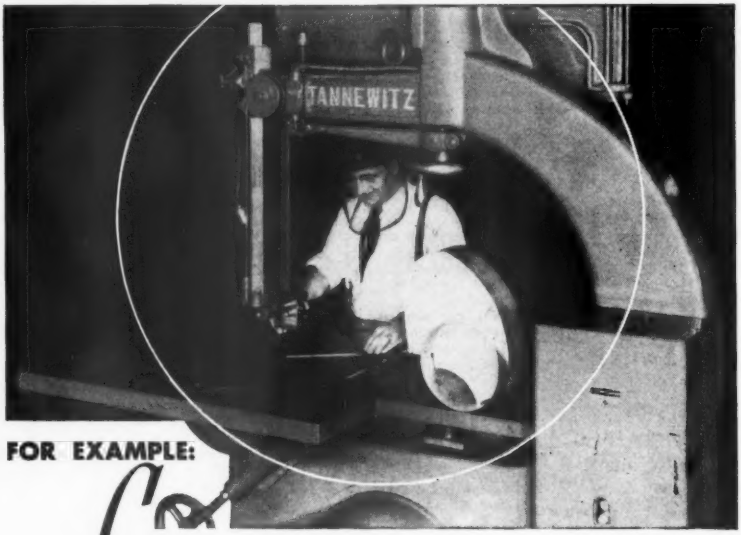

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8900 ALPINE AVE., DETROIT 4, MICH.

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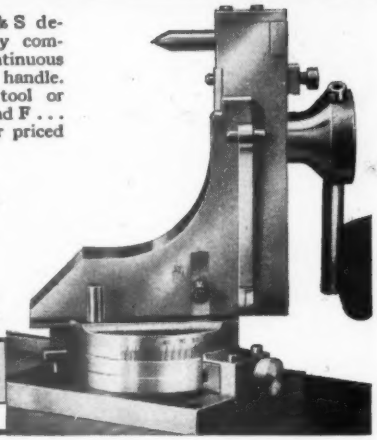


*REG. U. S. PAT. OFF.

J&S TOOL CO.
481 Main Street, East Orange, N. J.

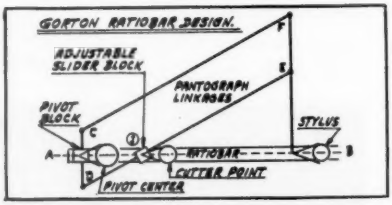
New Pantograph Design Improvement

A fundamental design improvement for pantograph machines called "ratiobar tracer control", the only principal progress made since pantographs were first built back in 1925, has been developed by George Gorton Machine Company and is applied to their new P13 3-dimensional pantograph machine. This new machine is in size, work-holding capacity, and metal removal ability directly comparable to the well-known Gorton 3-U 2-dimensional pantograph, incorporating the same reduction ratios with the exception of 1:1.

This exclusive Gorton "ratiobar", which simplifies and improves the operation of the machine, is supported at either end by the ruggedly-built and delicately-balanced over-arm and, for the first time in pantograph history, aligns the pivot center, cutter spindle and tracing stylus in an absolute straight line. Accurate ratio setting is simplified by the "ratiobar", as it maintains this straight line from A to B (shown on the drawing below) at all pantograph settings.

A rugged aluminum casting, pivoted horizontally and mounting two hardened and ground steel tracks, the "ratiobar" greatly reduces error occurrence by having but one slider block to adjust, regardless of reduction ratio desired. The tracer, which floats on precision ball bearings, moves out and away from the pivot center—the pantograph linkages move toward it, thereby maintaining a better balance than on conventional pantographs. Although this construction is extremely sensitive it gives, at the same time, rigid assembly.

This new Gorton P13 conforms to the requirements of producers of small, intricate dies, molds, stamps and hobs, in addition to performing conventional pantograph work. An enlarged 3-dimen-



Single ratio adjustment with slider block (1) fixes reduction ratio. Dotted line, A-B, is absolutely straight at all times because stylus, cutter spindle and pivot center are integral with the ratiobar. Area C-D-E-F likewise remains a true parallelogram.

sional master, or pattern, employed on this machine is mounted on the copy-table. The surface of the master traces in three dimensions manually while the cutter reproduces all of the angles, curves, and surfaces of the master. When used with the Gorton roll attachment, P13 produces light milling and engraving on cylinders, tubes, dials or on any peripheral surface.

Complete technical data on this new machine is available by writing George Gorton Machine Company, Dept. 7-11, 1321 Racine St., Racine, Wis., or by filling in INFORM-A-GRAM Key No. 711.

The FLEXOLAP ... A Step Forward in Lap Design and Function

- Instantly and Accurately adjustable for Fast Cutting and Polishing without danger of galling or seizing.
- Valuable time is saved—Better and Faster results are obtained—with FLEXOLAP.
- Illustration is Set No. 1. Six sizes (3/16″, 1/4″, 5/16″, 3/8″, 7/16″ and 1/2″) with six brass and six steel barrels on wood stand, complete ... **$12.75.**
- Also available in sizes 7/32″, 9/32″, 11/32″, 13/32″, 15/32″, 9/16″ and 5/8″.

★ ★ ★

- For lapping holes smaller than 3/16″ ... use the *Midget Lap.*
- FOURTEEN SIZES.. .032, .036, .040, .046, .054, .070, .079, .090, .104, .120, .135, .155, .170.
- TRIAL ASSORTMENT... 14 Laps..... **$1.50.**

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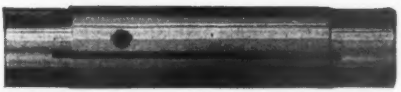


Federal Tool Corporation

401 No. Leavitt St. Chicago 12, Illinois

SEE ADVERTISERS INDEX, PAGE 99, FOR KEY NUMBERS

Mead "One-Man-Factory" Setups

The successful use of compressed air power for certain work-feeding and work-holding operations was introduced by Mead Specialties Co., Chicago, Ill., several years ago in the now well-known "Work Feeder". This unit successfully multiplied the production of a great variety of small items, using the reciprocal motion of a slide to close and open a set of jaws; the slide being actuated by an air cylinder.

A new rotary work feeder, Figure 1, carries this idea a step farther. The complete setup in this illustration, which includes a Mead pneumatic timer and two drill press feeds, performs two operations at the same time. However, more than two operations are possible, if desired, with this same setup. In this specific "one-man-factory", brass valve bodies are being drilled and reamed at two stations on the rotary table. The parts are loaded by hand at the front and ejected by a cam. After the air line is opened, the operator need only continue to load the parts as the table indexes.

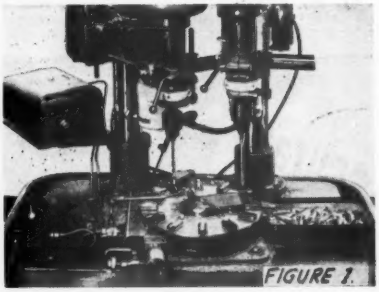


FIGURE 1.

A closeup view of the complete Mead "one-man-factory" setup is shown in Figure 2. The clean, quick-acting power of compressed air rotates the table of this setup, feeds the drill and reamer with uniform speed and pressure, blows away chips, and ultimately ejects the finished workpieces. The table locks in place at each station, and the arrangement of operating valves prevents table motion except when the drills are clear of the work.

Another Mead "one-man-factory" setup utilizing their pneumatic drill press feeds and timer, Figure 3, is used to drill ten different lengths of tubing. A master valve, which starts and stops the entire system, feeds air to all components of the machine and setup. A fixture operating valve actuates the work-feeder each time the spindle rises, and a one-way speed control valve automatically clamps work into position and ejects it upon completion.

Detailed information on these setups and the Mead pneumatic drill press feeds and timer, as well as a copy of their new air power catalog, is available from Mead Specialties Co., Dept. F-32, 4141 No. Knox Ave., Chicago 41, Ill., or fill in postage-free INFORM-A-GRAM Key No. 569.

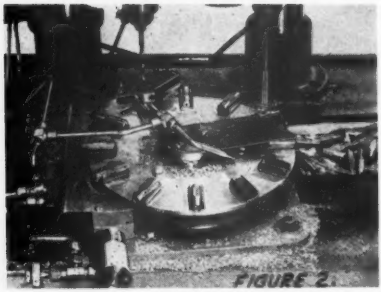
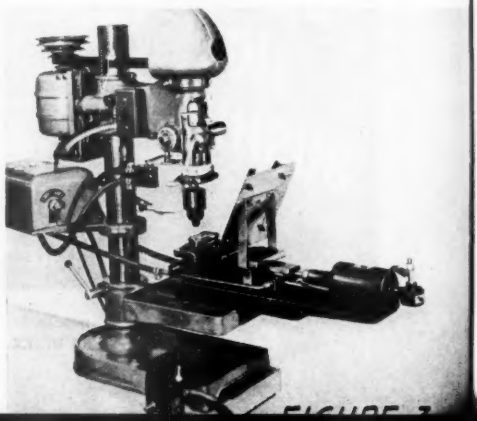


FIGURE 2.



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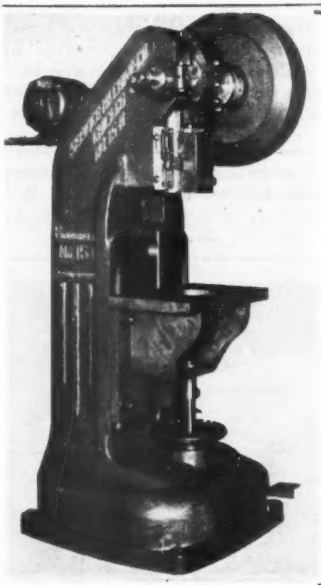
Don't ruin your T-Slots by fastening work with any old soft bolt that soon breaks down and wears the fine machining of the slot. WESPO T-Bolts will save this expense. They are made of high carbon steel, heat treated for maximum properties and are cad plated to prevent rust. They come in ½", ⅝" and ¾" diameters and in lengths from 1½ to 12 inches. Write today for bulletin and prices.

WESPO also manufactures a complete line of fixture parts and clamps. Bulletins on request.

WEST POINT MFG. CO.
19631 MERRIMAN COURT
FARMINGTON, MICHIGAN



NEW . . . VERSATILE . . . RUGGED . . .

the *Rousselle* **15** ton Horn Press

- **NEW:** The latest in new press design featuring ease of operation, increased die space (5½"-13"), large bed table working surface (11" x 15"), automatic knock-out bar, adjustable bed table, and non-repeating clutch.
- **VERSATILE:** Extremely flexible in its usefulness and adaptable to a wide range of applications. Equipped with 3" Horn Pole which can be used when press bed table is removed.
- **RUGGED:** Frame is a sturdy semi-steel casting proportioned to give maximum rigidity and special reinforcements in the bearings and throat.

See Your Local Dealer

Service Machine Co.
7631 Ashland Ave. • Chicago 20, Ill.

Electronic Control In Template Grinding

Precise grinding of templates used in layout and checking of automobile body dies and parts produced with such dies, up to 72" long, 8" deep, and 1" thick, without re-positioning, is accomplished with the Sheffield Template Grinder. The machine was originally designed for the specific purpose of precisely grinding templates used in laying out and check-

ing automobile body dies and the parts produced with such dies. These templates are approximately ⅛" thick, and as many as eight can be ground at one time. Templates for many other types of profiles, including those encountered in aircraft fuselage and wing manufacture, can be made at low cost due to the speed with which the grinding operation may be performed.

The Sheffield Template Grinder consists primarily of a base upon which wheelhead with control panel and optical equipment traverses, the electronic control unit and a work table with adjustable paralleled work supports.

The work, with the desired profile scribed on it by either a scriber or photographic process, or with a master template mounted on top, is clamped on the work table, as shown in the lower right-hand photograph. The supporting parallels are adjusted to the rough outline of the work. The wheelhead is positioned on the traverse ways by the electronic controls to bring the wheel opposite the point where grinding is to start. Axial movement of the workhead may also be accomplished by turning the knurled knob to the left of the handwheel.

The wheelhead may be adjusted on a turret to a maximum of 40° on each side of center so as to meet any conceivable requirement for positioning caused by shoulders and other irregularities of the profile to be ground.

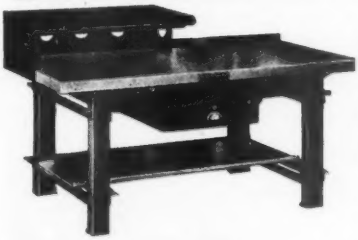
The grinding wheel reciprocating slide is then properly positioned for the required stroke within a range of 0" to 1¼". The speed of reciprocation may be set at either 50 or 100 strokes per minute.

The wheel is brought in to the work by a manual cross-slide feed handwheel. Two ratios of cross-feed (fast and slow) are provided. As demonstrated in upper left-hand photograph, the operator views the work through a 20-power microscope in setting the wheel to the work, and in performing the grinding operation. He guides the microscope cross-hairs along the lines of scribed work by means of a cross-slide handwheel as the wheelhead travels transversely. Four different reticles having diameters respectively of .005", .0075", .010", and .015" are provided with the microscope to be used for grinding work to varying degrees of precision.

Complete details may be obtained from The Sheffield Corporation, Dept. 24, Box 893, Dayton 1, Ohio, or use INFORM-A-GRAM Key No. 24.

Machinists' Choice

CHALLENGE
WORK BENCHES



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7. The Portability of Challenge benches. —Built with top 28 ins. wide, 2 ins. deep and 4, 5, 6, or 7 feet long.

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GRAND HAVEN, MICHIGAN

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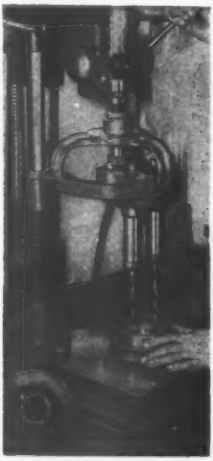
USERS SAY:

Production UP . . .
Costs DOWN!



2 HOLES• 1 STROKE

That's simple arithmetic with a LINDERME Two Spindle Drill Head on the job. Here's an adjustable precision drill head *low* in price, *high* in productivity. The versatility of this attachment makes it a gold mine in any shop. Linderme Drill Head users in general and production machine shops, plastics fabricators and others report great savings from a low initial investment . . . It's quickly set to variable centers from ½ to 6", drill capacity up to ⅝", adaptable to various tapping units. Models A and B for sleeve adaptation to drill press quills; Models C and D with "over-arm" arrangement, guide pins, springs and brackets mounted on heavy ground base for use with drill fixtures.

Write for Bulletin containing complete details.

LINDERME
MACHINE & TOOL CO., INC.
12250 COYLE AVENUE
DETROIT 27, MICHIGAN

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UNIVERSAL
DRILL BUSHINGS

Universal Drill Bushings with superhoned bores have been the first choice of industry since the founder of Universal Engineering Co. originated standard drill bushings nearly 30 years ago. Available in standard and special sizes to speed and simplify your jig drilling at greatly reduced tool breakage costs. Order direct from the Universal Sales warehouse nearest you: 89 Main St., Ansonia, Conn., or 5629 Sixth St., Kenosha, Wisc.

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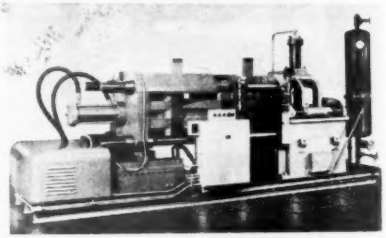
UNIVERSAL ENGINEERING CO.
FRANKENMUTH • MICHIGAN

Die Caster For Zinc, Aluminum And Brass Alloys

Fully hydraulic and self-contained, "HY-MAC" Pressure Die Casting Machine, Model M-114, for zinc, aluminum and brass alloys, is complete and ready for installation and production.

A simplified arrangement for installation of the plunger is accomplished in a few minutes without bolts or loose parts; gooseneck design accounts for long life and eliminates sticking plungers. Welded "automobile frame" construction of base assures complete rigidity of machine and perfect alignment of dies at all pressures. The insulated furnace keeps fuel costs at a minimum.



Safety arrangements are also included for operating valves and shot cylinder. Flow of water through water lines is visible to operator; all oil and water lines and connections are leakproof; "Deoxidizer" reduces dross to a minimum. Dies can be clamped on securely, even under unusual conditions. A complete unit, with the cold chamber arrangement into which the metal is ladled, is available for high pressure die casting of aluminum and brass alloys. In very few hours the "hot", or furnace, end can be interchanged for either zinc or aluminum and brass alloy production.

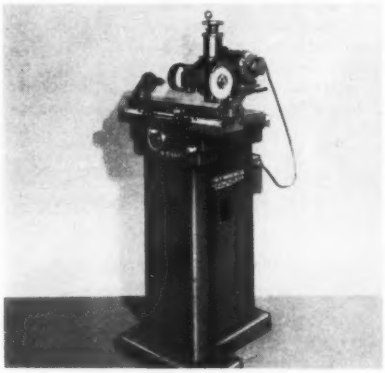
A heating unit for metal, valves, filters or strainers in lines and oil pump unit and motor equipment are furnished, the latter in over capacity.

Further information and principal specifications are offered by Hydraulic Machinery, Inc., Dept. 32, 12825 Ford Rd., Dearborn, Mich., or use INFORM-A-GRAM Key No. 32.

PLEASE USE INFORM-A-GRAM FOR PRODUCT INFORMATION

Small Tools Sharpening Machine

A large share of toolroom sharpening jobs of the smaller tool class, especially end mills, are responsible for the development of the new Brown & Sharpe #5 Cutter and Tool Grinding Machine. In addition to incorporating important toolroom efficiency improvements, this #5 has super-sensitive operation that is readily responsive to the lightest touch from the operator, making operation both fast and easy, and facilitating quick and accurate setups.



Prominent in making this ease of operation possible is the newly designed table sliding on 36 precision ground rolls. Lighter weight parts throughout the machine also contribute to fast and accurate sharpening and, in addition, a desirable work center height and conveniently located controls (four-location table crank or knob), whether operator is standing or sitting, are engineered for accurate and speedy control. Floor space has been made unusually small for a machine of its capacity (centers swing 6⅝" in diameter) and the hollow, one-piece base is mounted on three points.

Engineering data and a complete description are available from Brown & Sharpe Mfg. Co., Dept. 73, 235 Promenade St., Providence 1, R. I., or use INFORM-A-GRAM Key No. L73.

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the grade of

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DIAMOND COMPOUND

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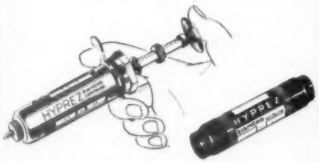

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HYPREZ DIVISION

ENGIS EQUIPMENT COMPANY

431 So. Dearborn St., Chicago 5, Ill., U.S.A.

Special Purpose Screw Machine Converted to High Production Machine

Conversion of their automatic screw machine into high production screw machine has been made by the Standard Machinery Co. Originally developed and used successfully in the production of bullet jackets, it has been converted to perform all normal screw machine operations on stock up to 1 inch diameter, with the exception of threading.

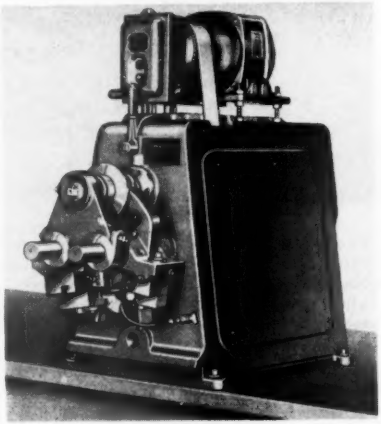
The features which this machine offers are: compact size, set up on 24" spindle centers; high production rate, quick chucking and cam shaft speedup; chip breaker, designed on principle of harmonic vibration; operating efficiency, all tool settings, cam adjustments and controls accessible at front of machine; low sales price permitted through advantages of design.

An outstanding improvement in the method of driving the feed cam shaft prevents the formation and clogging of long chips. This chip breaking feature is of particular importance in working plastics and other materials which tend to form long troublesome chips. Twice in each revolution of the spindle, the rotation of the feed cam is interrupted, thereby effecting an intermittent feed which breaks each chip as it is formed. Actually, the motion of the cam shaft does not stop entirely, but rather vibrates harmonically within an amplitude sufficient to break each chip. The tool dwells at the end of its movement while the work is made accurately cylindrical and to a smooth surface finish.

The basic machine, as shown in the photograph, performs two separate forming operations or a roughing cut followed by a finishing tool and a cut-off. Special attachments for drilling or boring are available, also a ball bearing stock stop incorporating a steady rest feature.

Control and movement of tools is provided at easily selected rates and without gearing. Feeds are adjustable in small increments within the units capacity. Feed cam shaft can be disengaged instantly and rotated slowly by hand for the setting of tools. The tools are reset against adjusted stops provided in the holder for fast tool replacement.

An important feature of the "Standard" Automatic is its ability to perform in shorter cycles, producing more pieces because of its quick chucking and cam shaft speed-up. No time is wasted while cams idle. Designed for utmost operating efficiency, all controls, tool settings, cams and adjustments are located at the front of the machine. Bar stock is readily introduced to the feed tube by the operator from the front. Butt ends of bar stock are ejected by manual control.



The stock machine provides for instantaneous advancement of bar materials up to 4" lengths, however, special work feeds can be provided for greater lengths.

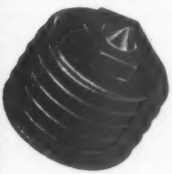
For complete details and specifications write Standard Machinery Co., Dept. 30, 1531 Elmwood Ave., Providence, R. I., or use INFORM-A-GRAM Key No. F30.

Metallurgical Research Reports

Two Research Reports for the Metallurgical Field, each containing 34 pages, have just been published by the American Gas Association. One entitled "Research in Controlled Vacuum Heating" presents experimental data, conclusions, and deductions on work done to determine the practicability of heat treating where there is no atmosphere surrounding metals during the heat treating cycle. A summary of the current literature and thought on the status of the causes and effects of corrosion of metals used in gas appliance construction by flue gas condensate in the second report. While this second report, "Literature Review of Corrosion of Metals and Materials by Flue Gas Condensate", refers particularly to heating appliances, the information will apply to any situation where metal flues are used to carry off the products of combustion resulting from gas. Request these reports from American Gas Association, Dept. 3, 420 Lexington Ave., New York 17, N. Y., or use INFORM-AGRAM Key No. M3.

A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 3/16" to 1" diameters.

Send for price list.

HEIMANN MFG. CO.
Dept T
Urbana, Ohio

Stampings ANY SIZE—
ANY SHAPE—MADE
QUICKLY AND ECONOMICALLY

HPL Manufacturing Company, through an exclusive process, is taking orders in quantities of twenty-five pieces and up for blanking, piercing, forming, tapping, countersinking, extruding, stenciling and similar operations on cold, punchable material. The HPL process assures fast, accurate, dependable work at low tool cost. It is flexible to change in design yet maintains the closest tolerances and exact duplication.

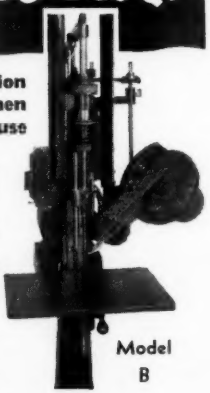
HPL *Manufacturing Co.*
2013 E. 65th ST., CLEVELAND 3, OHIO

STAMPINGS IN SMALL LOTS

You'll Break Records!

with your production assemblies when you use

DETROIT POWER SCREWDRIVERS

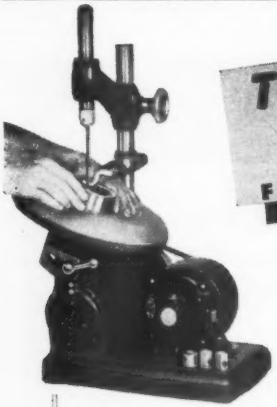


Model B

● You can drive screws at the amazing speed of one a second, effect a big saving in time and labor, and reduce costs substantially with these modern hopper-fed machines. 3 models to drive screws from No. 2 to ⅝" diameter. Will not mar heads or strip threads. All screws driven to uniform tension.

Send Sample Assemblies for Estimate and Free Catalog

DETROIT POWER SCREWDRIVER CO. 2827 West Fort Street Detroit 16 • Michigan



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FILES . . . SAWS . . . STONES

ILLINOIS DIE FILING MACHINE

An accurate, smoothly-operating machine that files, saws and stones the most intricate die shapes . . . eliminates tedious hand operations . . . reduces costs. It is quality-built for long, trouble-free service . . . hardened and ground shafts running in bronze bushings minimize wear. The holding chuck and clamping device provide perfect file alignment.

Sawing

Stoning

Write for descriptive literature.

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MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

M·B MODEL M-GR 75,000 R.P.M.

"JUNIOR" Pneumatic
GRINDER

This model has been engineered for applications where a small rugged tool can be used advantageously. Steel body for Safety. **Special grease-sealed bearings requiring no automatic or manual lubrication.** Compound rotors develop an abundance of power. Extremely lightweight, 12 oz. Whole length 5⅜"; Length of body 3". Accommodates mounted grinding wheels, rotary files, etc., on ⅛" dia. shanks. Prompt deliveries.

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YOST DRILL PRESS VISE

This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?

Write today for bulletin on the extensive Yost line

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1000 MAIN STREET
MEADVILLE, PENNSYLVANIA

HEAT-TREATED AND NORMALIZED

1,000,000 YEARS

Rahn Black Granite Surface Plates

Accuracy to .00005"

Warp proof. Shock proof. Will not "grow." Rust proof. No compensating bumps when nicked. Harder than hardened tool steel. Sheds abrasives. Non-magnetic. Smooth action of instruments.

Write today for bulletin and free trial offer in your own plant while present low prices are still in effect.

12" x 18" $59.00 and $75.00
18" x 24" $118.00 and $150.00
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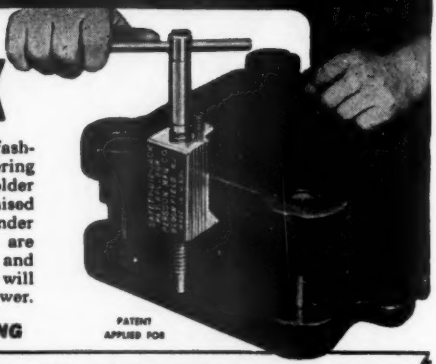
RAHN
GRANITE SURFACE PLATE CO.
1149 PLATT CIRCLE
DAYTON 7, OHIO

SEE ADVERTISERS INDEX, PAGE 99, FOR KEY NUMBERS

NOW YOU CAN SEPARATE AND ASSEMBLE DIE SETS.. QUICKLY.. EASILY.. SAFELY!

with a PERSSON

DIE JACK

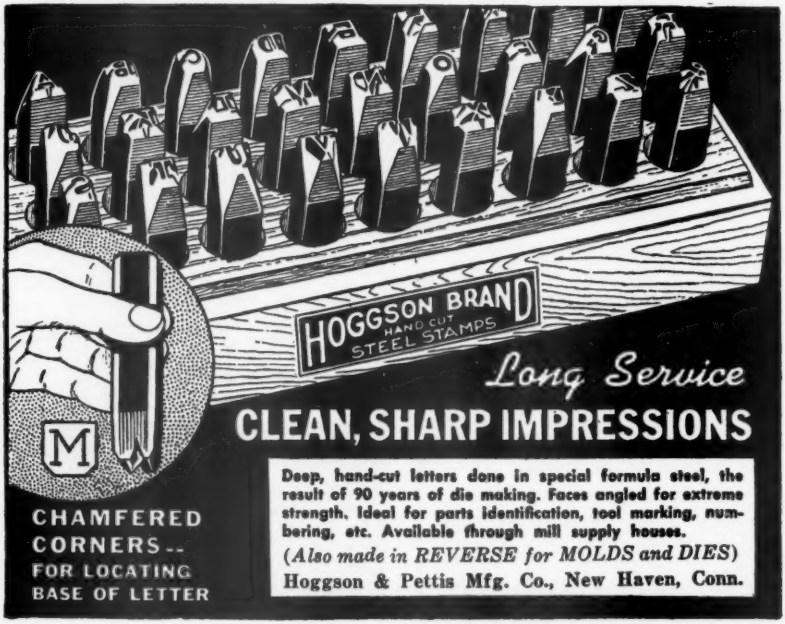


These Die Jacks eliminate old-fashioned, unsafe, prying or hammering methods. Just clamp on punch holder and turn handle. Punch holder is raised or lowered smoothly, always under control. PERSSON Die Jacks are precision built from fine steel and alloys—a tool every tool maker will want for his tool box or bench drawer.

PATENT APPLIED FOR

NO PRYING • NO HAMMERING

PERSSON MFG. COMPANY, 2 HENRY ST. BLOOMFIELD 4, N.J.



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CHAMFERED CORNERS -- FOR LOCATING BASE OF LETTER

Deep, hand-cut letters done in special formula steel, the result of 90 years of die making. Faces angled for extreme strength. Ideal for parts identification, tool marking, numbering, etc. Available through mill supply houses.

(Also made in REVERSE for MOLDS and DIES)

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LUFKIN INSIDE MIKES IN COMPLETE SETS

Head will measure down as small as 1½ inches. Write for free catalog. BUY THROUGH YOUR DISTRIBUTOR.

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THE LUFKIN RULE CO., SAGINAW, MICHIGAN, New York City.

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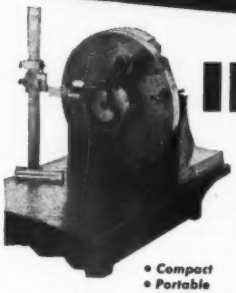
TEN RULES FOR GOOD TOOLS—

- Columbia's new 1948 calendar presents a formula for "good" perishable tools and dies.
- Calendar will be sent on request on company letterhead.

COLUMBIA TOOL STEEL COMPANY

NOW A NEW ERA IN INSPECTION

...The Sine Bar is Dead!



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INDEXMASTER

For Fast, Accurate, Low-Cost Precision Inspection

Here's the answer for speed combined with accuracy and precision in inspection So simple that even a semi-skilled mechanic can perform the most critical inspection operation in a fraction of the time normally required. The Indexmaster provides the utmost in faster inspection, greater output and reduced costs.

- Compact
- Portable
- Ready for Instant Use

ELIMINATES the Sine Bar in inspection operations
CHECKS angles with standard "Jo" Blocks.
SPEEDS layout of cams, jigs, fixtures, gauges, etc.

Ask your distributor for full information—or write the address below.

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CLEVELAND REPUBLIC TOOL CORPORATION

Sales Office, 1265 UNION COMMERCE BLDG., Cherry 1937 • Main Plant 9615 MEECH AVE., Diamond 7300

CLEVELAND, OHIO

SEE ADVERTISERS INDEX, PAGE 99, FOR KEY NUMBERS

You need only one

DORMAN TAPPER

. . . instead of three ordinary tappers . . . to tap No. 2-56 to 3/8" in steel or any other tappable material.

Here are three more advantages

1. No collets to get lost or need replacement.
2. Adjustable friction drive.
3. Can produce No. 3 or No. 4 fit.

The No. 2A tapper drives from 3/8" to 7/8" and No. 3-A drives from 1/2" to 1 1/4" in any tappable material.

Price No. 1 Size $44.00 with M. T. Shank or $50.00 with Adapter for Male Spindle Drill Press. Round Split, Button or Acorn Die Holder Assemblies in stock for all size Dorman Tappers permitting their use for external threading.

Write for Die Holder Bulletin

DORMAN MACHINE TOOL WORKS
36 Mac Questen Parkway S. Mt. Vernon, N. Y.

BIG NEWS ANNOUNCING 1 1/2 INCH CAPACITY

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COLLET CHUCK

FOR ALL TURRET AND ENGINE LATHES

***Added to* THE OVERWHELMINGLY APPROVED 1-INCH SIZE RECENTLY INTRODUCED**

PROVED STEPPED UP PRODUCTION 50 TO 100%

- Assures greater speed and accuracy
- Stronger, more positive work grip
- Maximum ease of operation
- Simple finger-tip adjustment

See Your Distributor or Write for Catalog

PORST BROS MFG. CO. 257 N. California Ave. Chicago 12, Illinois

Manufacturers of Collets and Fingers for 25 Years

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DANGER

In doing a lot of unnecessary Cutting, Planing, Grinding, Inspection, etc., in Steel Flats . . . . *When You Can Get*

GROUND FLAT STOCK

Ready-to-Use in sections up to 1¼" x 10" from our stock!

Write for New Catalog—Box 58-A

Special Sizes Heat-Treated or Soft, Ground to Your Specifications.

*Production Surface Grinding on huge MATTISON GRINDERS

MARSHALL STEEL
LISLE, ILLINOIS

THIS NEW TOOL Saves 40% of LATHE THREADING TIME

Eliminates gooseneck tool troubles because the cutting point retracts in a horizontal plane. "50-¼"/24 tool steel taps threaded without regrinding tool point" is what one user states.

Much heavier cuts can be taken without damage to tool point or work. More uniform cutting action — better threads. Adjustment of spring pressure can be made while cutting threads. Parts surface hardened and treated to prevent rust.

Price, No. 1-B: $16.50

IMMEDIATE DELIVERY

Descriptive folder available

GUARANTEE TOOL CO., INC.
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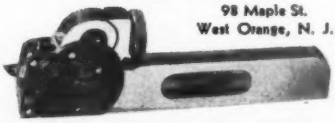
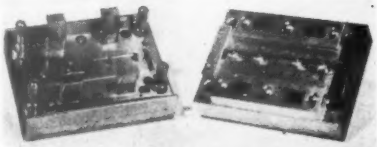


- **PLASTICS MOLDS**
- **DIE CASTING DIES**
- **METAL STAMPING DIES**



The above cam action mold is an example of ANKNEY GUARANTEED PRECISION. This mold is now saving the owner many times its original cost. If accuracy counts — contact ANKNEY for guaranteed precision. Tolerances rigidly held. Prompt attention will be given to all prints or parts submitted for quotation.

Write for details today

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CUT ANY SHAPE CLEVERLY with a BEVERLY SHEAR

Regardless the shearing job, straight or irregular, you can do it faster—better with a BEVERLY Throatless Bench Type Shear. Comes in 3 sizes . . .

No. B1—cuts 14 gage—weight 13 lbs.

No. B2—cuts 10 gage—weight 35 lbs.

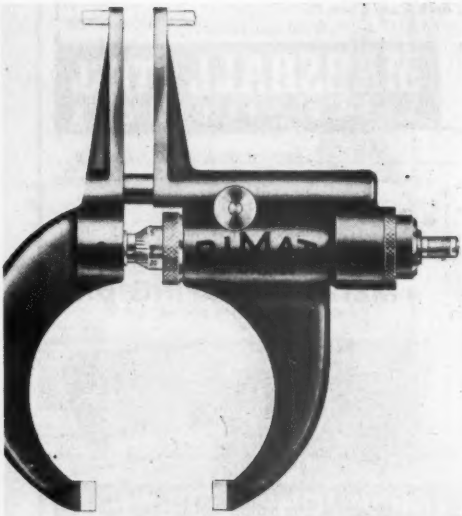
New Junior—cuts 18 gage. weighs 6 lbs. Stands available for B-1 and B-2 and B-3 Beverly's.

No. B3—(Equipped with ball-bearing holddown device)—cuts 3/16 inch mild steel or 10 gage stainless, wt. 58 lbs.

THE BEVERLY SHEAR MFG. CO., 3008 W. 111th ST., CHICAGO 43, ILL. DEPT. 7

PROGRESS

NEW DEVELOPMENTS • IMPROVEMENTS • COST AND TIME SAVERS



CIRCLE KEY NUMBERS ON POSTAGE-FREE INFORM-A-GRAM INSERT FOR FURTHER INFORMATION

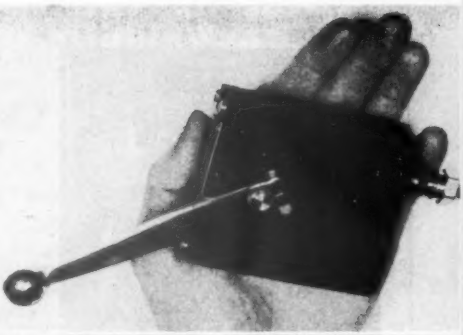
"RIMAT" DUPLEX MICROMETER, a companion tool to the Rimat inside micrometer, now makes it possible to measure internal and external diameters with one tool. All wearing surfaces on this "Rimat" are hardened and ground and, in addition, the ends of the measuring pins are hardened and ground on a radius for accuracy and to prevent cramping. Easy-to-read graduations and the positive readings obtained eliminate errors and make for speed and accuracy of all measured parts. This new "Rimat" is regularly made in three sizes, 0-1", 1-2" and 2-3". RICHARDS MACHINE TOOL CO., Dept. 26, 124 S. Isabel St., Glendale 5, Calif., or use INFORM-A-GRAM Key No. M26.

NEW LOW COST PACKAGING PLASTIC called "Thermodip N.S." is a hot melt compound for protecting machine tools, cutting gears, etc., from corrosion, abrasion, and the hazards of shipping and handling. The new member of the "Thermodip" series, while lower in cost, has a higher tensile strength, greater elongation and slightly lower melting point. "Thermodip N.S." is pale amber in color and because of its transparency, identifying marks can easily be read. Also, it is easily removed by stripping, can be used repeatedly, and holds its flexibility and properties over extended periods. Address ERONEL INDUSTRIES, Dept. 25, 5714 W. Pico Blvd., Los Angeles, Calif., or use INFORM-A-GRAM Key No. M25.

COMBINATION REDUCING REGULATION VALVE AND PRESSURE GAGE, which reduces the line or primary pressures to a desired lower working pressure, is announced by The Dayton Rogers Mfg. Co. This new gage is made in four sizes, namely, ¼", ⅜", and ¾" pipe size connections and automatically maintains such pressures as are required on the pneumatic tools used off the shop airline. At all times the amount of air pressure used on the tools or apparatus is accurately recorded. Also, these units can be used universally on all shop airlines for regulating the air pressures from 5 to 150 psi. DAYTON ROGERS MFG. CO., Dept. 6-19, 2835 12th Ave., Minneapolis 7, Minn., or use INFORM-A-GRAM Key No. 619.

ON PARADE

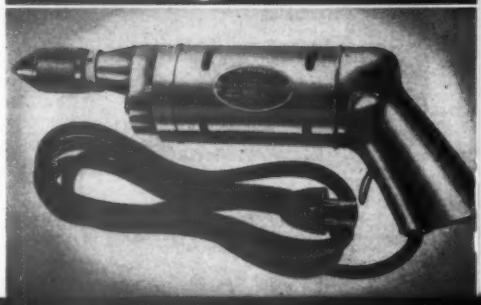
MINIATURE LIGHTWEIGHT HYDRAULIC REMOTE CONTROL manufactured by Sperry Products, Inc., has a torque capacity of 50 lbs. per inch on the pressure stroke and is rated as much as 50 per cent more powerful than the earlier and slightly heavier Sperry model. This miniature remote control provides "feel" control of a distant mechanism since any motion of the transmitter arm will be duplicated instantaneously by the receiver arm. Also either arm will move through an arc of 60°. SPERRY PRODUCTS, INC., Dept. 85, 15th St. & Willow Ave., Hoboken, N. J., or use INFORM-A-GRAM Key No. G85.



AIR SCREWDRIVERS WITH FRICTION CLUTCH. Models 7037 and 7039, for #4 to #8 wood or machine screws, incorporate a new friction clutch attachment, using ¼" hex shank bits or ¼" hex adaptor with square drive for nut setting. Model 7037 (illustrated) has a lever throttle, comes complete with 8' of ¼" hose with fittings, speed regulator, one finder, three bits of size specified, and a suspension bail. THE ARO EQUIPMENT CORP., Dept. 1-95, 1941 Erie St., Bryan, Ohio, or use INFORM-A-GRAM Key No. 195.

EXTRA HEAVY DUTY PLUNGER CLAMP called "The Ram" is capable of exerting over 2500 pounds normal pressure. One of "The Ram's" outstanding features is that the handle is down when the clamp is closed. In addition, the operating motion is downward and away from the work; the heavily loaded handle provides split-second closing as merely tipping the lever will close the clamp with considerable pressure. Designed primarily for heavy work-holding fixtures, this clamp is also readily adaptable to such conversions as light arbor, punch and forming presses, etc. Address DETROIT STAMPING CO., Dept. K, 344 Midland Ave., Detroit 3, Mich., or use INFORM-A-GRAM Key No. 165.

PISTOL GRIP PORTABLE ELECTRIC DRILL that is ideal for industry, shop and home workshop has been announced by Portable Electric Tools, Inc. A comfortable pistol grip handle with trigger switch control, lightweight stator housing, screw-on drill chuck, oil-retaining bronze bearing, and a six-foot heavy-duty flexible rubber-covered cord and plug are features of this air-cooled and newly designed tool. Write to Mr. A. W. Miller, president, PORTABLE ELECTRIC TOOLS, INC., Dept. 24, 255-259 W. 79th St., Chicago 20, Ill., or use INFORM-A-GRAM Key No. M24.

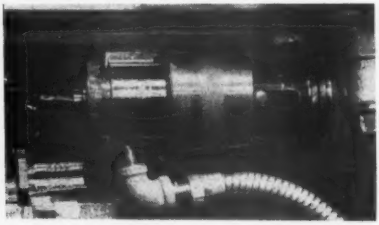


PROGRESS ON PARADE

METALLIC SHEATHED GRINDING WHEEL, made of vitrified or ceramic bond, contains certain basic improvements incorporated into the bond, which, when coupled with the metallic sheathing, provides distinct advantages over conventional grinding wheels. The makers of this wheel, Chicago Wheel & Mfg. Co., show in their literature how there

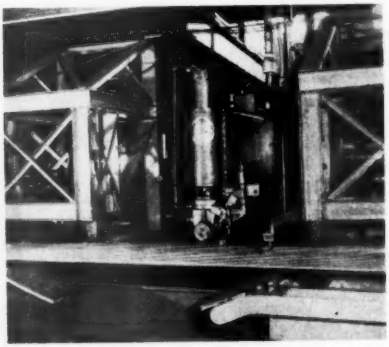
is a pronounced tendency to dissipate heat generated at the arc of contact over the entire area of the wheel. Heat travels up the metallic sheathing and is rapidly dissipated; and the water-proofing qualities of the metallic film on the sides of the wheel keep the coolant at the arc of contact for cooler cutting action and to avoid burning work. Surface grinding, internal grinding and tool-and-cutter grinding can be handled with this new wheel. CHICAGO WHEEL & MFG. CO., Dept. 6-42, 1101 W. Monroe St., Chicago 7, Ill., or use INFORM-A-GRAM Key No. 642.

NEW RATIO RECESSING TOOL designed especially for high speed automatic machine operation to accomplish grooving, backspacing and recessing operations with extreme accuracy has been announced by The



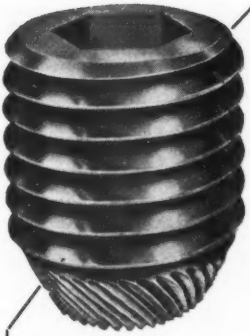
Maxwell Co. Multiple cuts can be made with this tool with the same accuracy as a single cut, and accuracy is assured to within 0.001". Additional features include a coolant hole which permits flow of coolant or lubricant to cutter and a replaceable pilot, permitting rotation of either tool or workpiece, depending upon the application. Cutters are made to meet individual specifications and cutters can be equipped with carbide tips. Get complete data from THE MAXWELL CO., Dept. 4, 225 Broadway, Bedford, Ohio, or use INFORM-A-GRAM Key No. K4.

INDEXING AND TRAVELING SPOT WELDER which has a 32-foot table and makes four spot welds at the same instant and then moves across the assembly to a new position, making another set of welds, is a product of the Progressive Welder Co. This resistant welding equipment was designed and manufactured for Steel Products Co., Inc., and is used to weld side and roof panels to their "Great Dane" truck trailer frame members. Steel Products Co., Inc., reports that the welder is almost completely automatic, al-



though adjustable stops permit production of all different size panels. The only manual operations required are supplying machines with stock and removing finished assemblies. As a result a remarkably high quality and uniformity of welds is obtained, which has meant more rugged trailer bodies and improved appearances. Request detailed information from the manufacturer, PROGRESSIVE WELDER CO., Dept. 1-46, 3050 E. Outer Drive, Detroit 12, Mich., or use INFORM-A-GRAM Key No. 146.

NEW DESIGN MICROMETER ADJUSTABLE BORING BAR, precision built to give greater ease of adjustment and a new high in precision accuracy, will save from one-half to two-thirds in time on milling machines, turret



"Unbrako" Products are sold entirely through Industrial Distributors.

Knurling of Socket Screws originated with "Unbrako" in 1934.

The **KNURLED** *Cup Point*

OF THIS UNBRAKO

Reg. U. S. Pat. Off.

SOCKET SET SCREW . . .

. . . makes it a Self-Locker because the point, so cunningly knurled, when tightened to dig-in, stays dug regardless of the most chattering vibration. Yet, it can be used over *again* and *again*.

Write for your copy of the "Unbrako" Catalog of Socket Screw Products.

OVER 44 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. EDGE HILL 0400 · BRANCHES: BOSTON · CHICAGO · DETROIT · INDIANAPOLIS · ST. LOUIS · SAN FRANCISCO

LIFT-SWING PATENTED

Fixtures for DRILLING TAPPING - COUNTERBORING INSPECTION - *at one setting*

Lift-Swing in closed position

Lift-Swing open — note absence of projections over work

Amazing savings made by users of the Lift-Swing Fixtures shown here because Bushing Plates LIFT and SWING aside for inspection of work or additional machining operations—AT ONE SETTING.

Die Set accuracy is maintained because hardened and ground bushings in plate slide on stationary guide and pilot pins.

Right angle bearing faces permit drilling in two planes—cam lock release handle permits FAST OPERATION.

TOP PLATES INTERCHANGEABLE

Bushings and pins always locate bushing plates in exactly the same position—a single base can be used for several jobs.

11 standard sizes with clearance between base and bushing plate from 2¼" to 7". Base sizes from 2¼" x 4¼" to 4" x 8".

Send for 8-Page Bulletin

Acme Tool Manufacturing Company

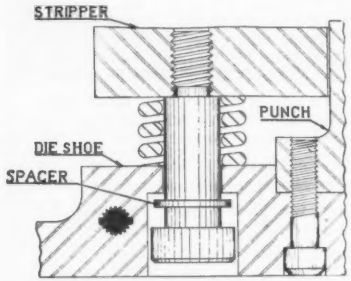
52 Perry St., Belleville 9, N. J.

SEND FOR NAME OF NEAREST SUPPLY HOUSE

lathes, jig borers, and horizontal boring mills. Adjusted on the same principle as a micrometer, this new tool is especially adapted for boring long holes and holes that are hard to reach, or boring inside a casting which is

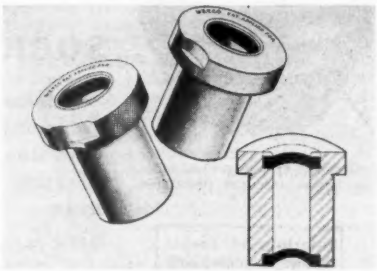
larger in diameter than the outside hole, and for bottoming. The tool can also easily be removed without changing the adjustment on machine, and the tool bit is removable either for sharpening or replacement. All particulars are available from MELIN TOOL CO., Dept. 1-09, 3371 W. 140th St., Cleveland 11, Ohio, or use INFORM-A-GRAM Key No. 109.

STRIPPER BOLT COMPENSATOR SPACERS which are simply inserted under the head of the stripper bolts to put dies back into production again quickly are described in literature received from Federal Tool & Manufacturing Co. These new spacers are of absolute uniform thickness and are nickel plated, are packed 250 to a box, and are available in all sizes, the two most popular spacer thicknesses being: $\frac{1}{32}$" (.031) and $\frac{1}{16}$" (.062) for $\frac{3}{8}$" and $\frac{1}{2}$" diameter stripper bolts. They



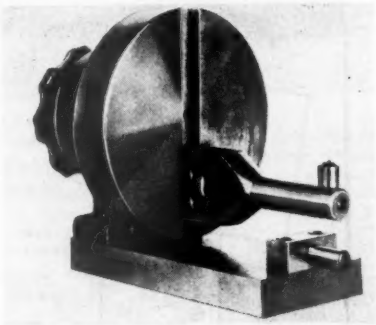
are also ideal for pressure pads, knock-outs and similar applications. For further information address FEDERAL TOOL & MANUFACTURING CO., Dept. 86, 3212 N. Washington Ave., Minneapolis, Minn., or use INFORM-A-GRAM Key No. F86.

CARBIDE-INSERTED DRILL JIG BUSHINGS, manufactured to the dimensional standards of the ASA, which retain the desirability of a hardened steel bushing plus giving the advantages of carbide at the points of wear, are described and priced in new literature from W. F. Meyers Co. The tungsten carbide insert at the two points of wear insures much longer life and greater accuracy for a longer period of time. The hardened steel ring inserted above the top carbide ring protects both the carbide and the drill against shock of impact. These advantages mean less non-



productive machine time, non-productive manhours, waste due to spoilage of parts, and greatly increased drill and reamer life. All details are available from W. F. MEYERS CO., Dept. 6-77, 1014 14th St., Bedford, Ind., or use INFORM-A-GRAM Key No. 677.

RADIUS EMERY WHEEL DRESSER manufactured by Montgomery & Company is designed to meet the demand for an inexpensive tool of this kind. All concave radii up to and including 2½" and all convex radii up to and including 1⅜" can be dressed with this new wheel. Literature on this radius



emery wheel dresser and on other time-saving devices for the machine and tool industries is available from MONTGOMERY & COMPANY, Dept. 89, 53 Park Ave., New York 7, N. Y., or use INFORM-A-GRAM Key No. H89.

SCHERR *aids to precision – production*

SCHERR MICROMETERS

have vernier readings to 1/10,000 at no extra cost, in 1", 2" and 3" sizes. This is right in step with modern demands for higher accuracy. Purchase now of these fine Scherr manufactured micrometers will insure against future obsolescence. Available in sizes up to 96". All Scherr micrometers offer these advantages: solid forged frames; easy reading graduations on thimble and vernier; longer life and more sensitive touch due to a burnishing process which compresses and polishes the surface of the thread; such refinements as ratchet stop to control the measuring pressure, and decimal equivalent markings on frame or barrel. Scherr micrometers are noted for their moderate prices. Write for bulletin and order the micrometers you need now.

SCHERR TOOL STAND

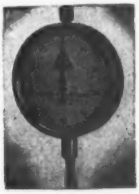
Cuts inspection time almost in half by freeing both hands of operator, and holding micrometer or snap gage in most convenient position. Also prevents body heat affecting tool readings. One of those small, inexpensive items worth many times its cost in saved time. Try a few—then order a quantity.

SCHERR DEPTH MICROMETERS

Made with 2½" and 4" base. Each instrument furnished with three interchangeable rods, to measure depth to 1", 2", or 3". With or without locknut and ratchet. A handy tool that can save its cost in a single precision job.

SCHERR DIAL INDICATORS

Last longer and cost less. Have an exclusive mechanism of extra sturdiness, with only three moving parts. No quick spinning wheels nor unhardened racks. Furnished with standard back or with ball joint back for setting at any angle. Contact points for all needs. With clamp holder, extension bar, tool-post holder, in compact metal case.

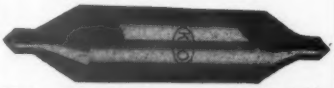


● Write for full details on the above tools.

GEO. SCHERR CO., Inc.
197-A Lafayette St. New York 12, N. Y.

KEO

CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for *immediate delivery*. Specials made to your specifications.

KEYSEAT CUTTERS

High speed. Right hand. ⅛" shank. Diameters from ¼" to 1⅛". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS

High speed steel. Reamers from ¼" to 1" regularly furnished with 60°, 82° or 90° included angle. Specials made to your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from 3/16" to 1" are .0005" undersize at small end, from 1-1/16" to 3", .001" undersize. Immediate delivery.

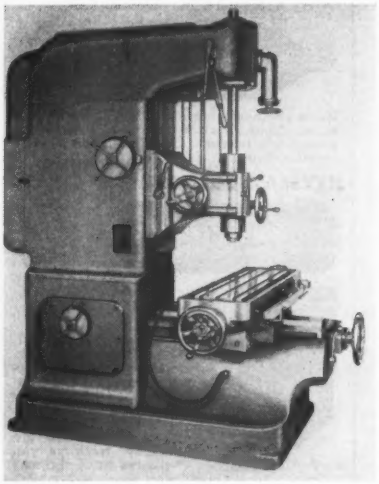
Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS Inc.
19326 Woodward - Detroit 3 Mich.

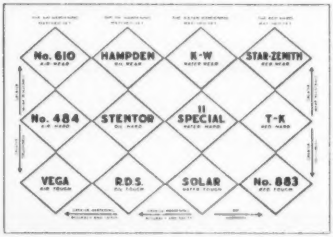
PROGRESS ON PARADE

VERTICAL MILLING AND PRECISION BORING MACHINE COMBINATION, designated No. 50, which incorporates several new features has just been introduced by W. B. Knight Machinery Co. Even though the No. 50 is designed to make operation very simple, it is adaptable to an extreme range of work;



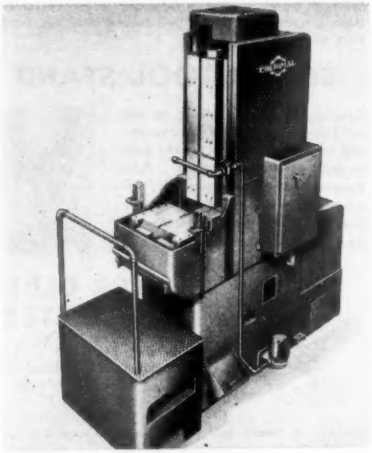
and, in addition, it offers exceptional speeds and power for rapid metal removal. For shops doing a variety of work this new combination machine offers all the advantages of an accurate solid-base boring machine and rigid vertical milling machine. Full particulars are available by writing W. B. KNIGHT MACHINERY CO., Dept. 3-51, 3920 W. Pine St., St. Louis, Mo., or use INFORM-A-GRAM Key No. 351.

MATCHED SET SIMPLIFYING TOOL STEEL SELECTION developed by The Carpenter



Steel Co. for tool and die makers incorporates 12 steels that are so inter-related that each takes up the work where the other leaves off. As a result, tool makers can actually know in advance what results to expect as they move from one steel to another. The tool steel user can now also choose from far fewer steels to do over 90% of his tool making jobs, which means less complicated heat treating procedures, lower inventories, and fewer chances of tool steel mix-ups. Detailed information on the selection, heat treatment and uses of the steels in this matched set can be obtained from THE CARPENTER STEEL CO., Dept. 38, 306 W. Bern St., Reading, Pa., or use INFORM-A-GRAM Key No. B38.

THREE NEW IMPROVED LINES OF PULL-UP, PULL-DOWN and single ram surface broaching machines of the vertical type, in a complete range of standard tonnages and



strokes, have been announced by Colonial Broach Co. An externally mounted hydraulic system layout, easily cleaned filters, handy controls, and a faster ram return are all features of the new machines which are designed to obtain the highest possible production rate by running continuously, producing more pieces per hour, and reducing frequency and duration of possible down time. Detailed information may be requested from the COLONIAL BROACH CO., Dept. 26, P. O. Box 37, Harper Station, Detroit, Mich., or use INFORM-A-GRAM Key No. 26.

TOOL POST FOR ENGINE LATHES which permits an unlimited number of machining operations from one setup has just been announced by A. K. Tool Co. Changing tools for different operations can be accomplished

OVER 5000 SHAPES AND SIZES

CHROME STEEL PRECISION

SWISS FILES

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TODAY MORE THAN EVER YOU GET MORE VALUE FOR YOUR MONEY AND YOU GET THE FILE YOU NEED FOR A SPECIFIC PURPOSE—no substitutes, no "near as good". That's why more and more are exclusively using GROBET Chrome Steel SWISS FILES—the oldest name in files, and the undisputed leader where precision is demanded.

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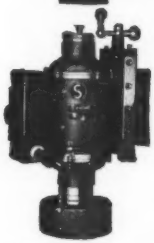
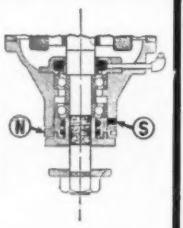
Plants: New York - Chicago - Los Angeles

STANDARDIZE WITH STANDARD



This sectional view illustrates a creation of STANDARD engineers — evidence that you receive more when you buy a STANDARD tool. Sectional view of thrust bearing construction on all STANDARD modern Vertical Spindle and Double End Disc Grinders.



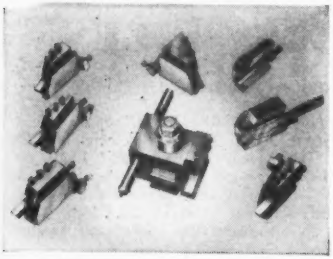
Threaded Nut "N" permits fractional thousandths adjustment by releasing Set Screw "S" to take up wear on bearings without removing wheel—no shims involved.

The STANDARD Vertical Spindle Grinder is made in sizes from ½ H.P. to 15 H.P. Speeds of 1150, 1750 or 3450 r.p.m. for cup or plate mounted cylinder type of wheel. Suitable for application to Planer, Boring Mill or special purposes.

Write for Catalog.

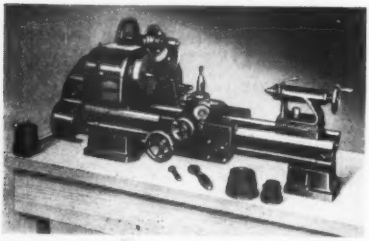
SEE ADVERTISERS INDEX, PAGE 99, FOR KEY NUMBERS

in about the same time required to index a turret tool post with this new tool, and it is ideal for both production and non-production lathe work. The extreme rigidity of the tool post holds tool bits in a perfectly parallel position at all times, making it adaptable for



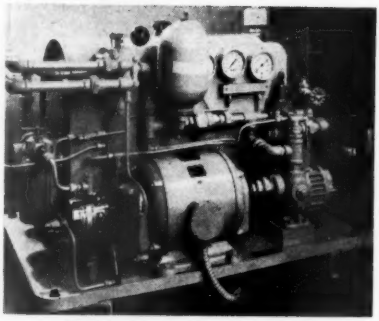
use with carbide tool bits. Also one or more tools can be replaced or readjusted after grinding without affecting the setting of other tools. Obtain complete information from A. K. TOOL CO., Dept. 22, 2027 Blake Ave., Los Angeles 26, Calif., or use INFORM-A-GRAM Key No. M22.

HAVING THE SAME BASIC ADVANCED DESIGN FEATURES that characterize large lathes of the Logan line, the new 9-inch lathe now in production at Logan Engineering Co. has a 9-inch swing, 18" between centers, and is built for economy as well as lasting accuracy in precision manufacturing operations, general machine shop and tool room work.



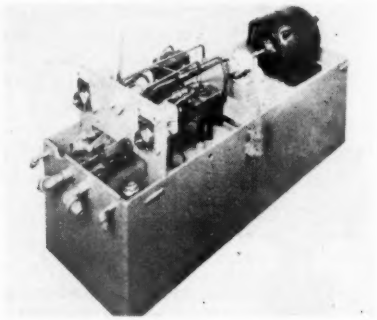
The ball bearing spindle mounting is well adapted to high-speed operations. Other features include two V-ways and two flat ways on the bed. Catalog No. 400 is available from LOGAN ENGINEERING CO., Dept. 2, 4901 W. Lawrence Ave., Chicago 30, Ill. INFORM-A-GRAM Key No. 2.

OFFERING AUTOMATIC HIGH-LOW HYDRAULIC PRESS OPERATION in one complete well-engineered unit, the SECO Fluid Power



Package developed by Simplex Engineering Co. automatically holds a predetermined high pressure after it is reached and makes it possible to operate two or more presses alternately through intermittent unloading of the pumps. Built around the special SECO Radial High Pressure Pump which generates pressure up to 10,000 psi, this unit is designed for long, versatile usage and easy maintenance. Get descriptive folder from SIMPLEX ENGINEERING CO., Dept. 66, Zanesville, Ohio. INFORM-A-GRAM Key No. F66.

COMPLETELY SELF-CONTAINED WITH MOTOR, PUMP, VALVES AND FLOW CONTROLS mounted conveniently, the new hydraulic power unit announced by Hufford Machine Works is built for activating any hydraulically driven machinery. Completely covered to prevent the entrance of dust or foreign matter, this unit also features built-in selector



valves which enable both forward and reverse motion of the machine, with speed of the driven mechanism variable over a wide range. HUFFORD MACHINE WORKS, Dept. 9-36, 207 N. Broadway, Redondo Beach, Calif., or use INFORM-A-GRAM Key No. 935.

PROTECT AIR TOOLS *from* MOISTURE DAMAGE

• Condensation of water in your air lines washes out the lubricating oil and causes expensive damage to air tools and pneumatically-operated equipment.

This condensation occurs when the temperature of the air surrounding your lines and tools falls below that of the compressed air. Ordinary cooling with surface water does not prevent this, but it is prevented by the Niagara Aero After Cooler which always cools below the dry bulb temperature of the surrounding air.

In addition, the Niagara After Cooler saves you the cost of water in cooling and pays for itself in a short time.

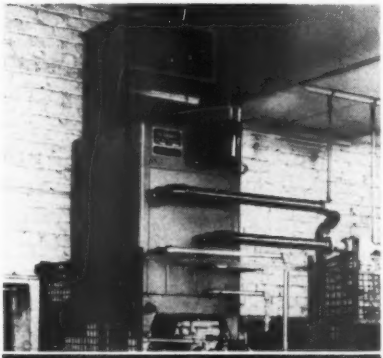
Write for Bulletins 96-TD and 98-TD

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

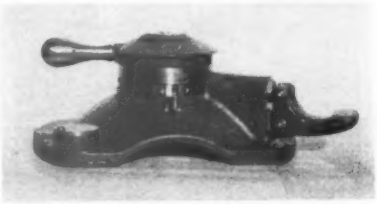
405 Lexington Ave.
New York 17, N.Y.

District Engineers in Principal Cities



INDUSTRIAL COOLING • HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

G & H *INDEXING COLLET FIXTURES*



★ *Provides faster finishing of multi-machined precision parts.*
★ *Lubricant or air passing through is eliminated.*

SPEED the machining of pieces requiring several similar operations on one machine.

ACCURACY is rigidly maintained by automatic self-seating plunger that locks the index plate.

VERSATILITY in operation. Can be easily mounted on millers, grinders, shapers, and drill presses. The interchangeable index has 2, 3, 4, 6, 8, 12 or 24 stops as standard equipment.

ECONOMY in savings from less down time, less part handling and more uniform production.

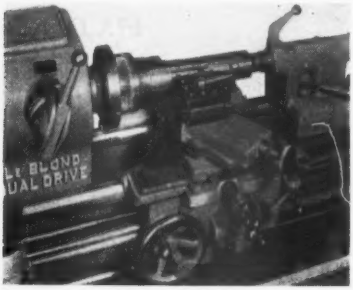
SEND FOR FREE FOLDER

G & H Manufacturing Co.
327 Elm St. Fitchburg, Mass.

Distributors — Write for territory now available in U. S. and Canada.

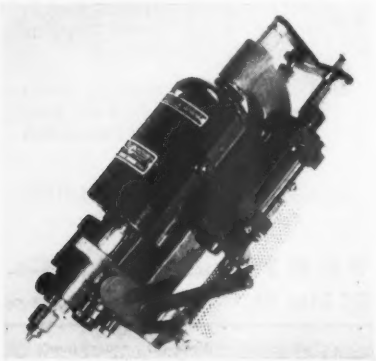
SEE ADVERTISERS INDEX. PAGE 99. FOR KEY NUMBERS

OFFERING EXTREME RIGIDITY FOR CARBIDE TIPPED TOOLS which are supported by a flat base and clamped with at least three screws, the new Tool Post Turret designed especially for the LeBlond Dual Drive Lathe

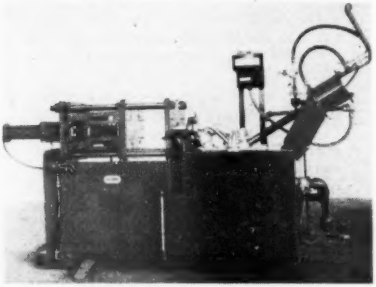


enables quick setup for threading at 12 stations with 30° indexing. Tools may be mounted in three different working positions, for use on more than one operation. Quick, easy indexing and elimination of chip interference are possible, because an equalizer spring is utilized to keep the tool block and clamping lever in constant contact. Data may be obtained from ENCO MFG. CO., Dept. 30, 3320 W. Montrose Ave., Chicago, Ill., or use INFORM-A-GRAM Key No. B30.

FASTER SMALL HOLE PRODUCTION, accomplished through maximum drilling efficiency and minimum time delay between actual drillings, is achieved with the new Electro-Mechano Automatic Drilling Unit which combines a hydro-checked air motor with a Speed-Right drill head. Speeds within ranges 1,000 to 10,000 rpm or 2,500 to 15,000 rpm are instantly available. Overdrilling is prevented through the use of a positive mechanical depth stop. Full details are obtainable from THE ELECTRO-MECHANO CO., Dept. 79, 261 E. Erie St., Milwaukee 2, Wis., or use INFORM-A-GRAM Key No. H79.

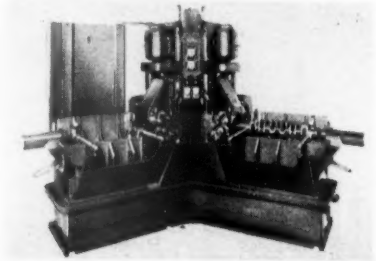


DESIGNED FOR USE BY FIRMS REQUIRING INTERMITTENT PRODUCTION DIE CASTING WORK but not having the facilities or need for establishing a regular die casting division, the new, completely self-contained "Hot-Shot" Die Casting Machine manufactured by the



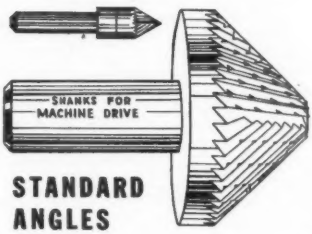
Robert A. Cox Co. is a medium sized machine needing the simplest kind of installation. Capable of holding 300 pounds of zinc alloy, it requires no specially trained operator and is easily maintained. Explanatory material about the many features of this machine may be requested from the sales distributor, the ERMAC CO., Dept. 22, 1426 S. Santa Fe Ave., Los Angeles 21, Calif., or use INFORM-A-GRAM Key No. K22.

CLAMPING WORK PARTS HYDRAULICALLY and loading and unloading parts at one station while the other is in operation, the special dual automatic keyway cutter designed and built by Snyder Tool & Engineering Co. cuts two keyways in a large crankshaft at each station. This machine is push-



button controlled with rapid advance and return. SNYDER TOOL & ENGINEERING CO., Dept. 4-66, Detroit, Mich. INFORM-A-GRAM Key No. 466.

INSIDE DEBURRING CUTTERS



STANDARD ANGLES
30° - 45°
STOCKED IN 8 SIZES
EACH ANGLE

SPECIAL ANGLES
FROM STOCK BLANKS

HIGH SPEED STEEL

HANDLES
FOR
HAND USE
(4 THREAD SIZES)

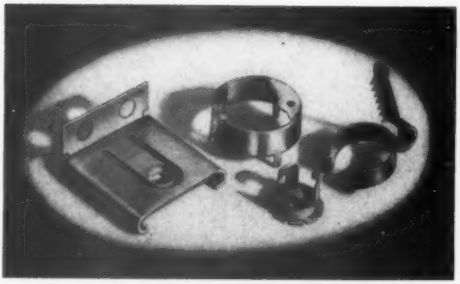
RADIUS TYPE
10 SIZES

WRITE FOR BULLETIN NUMBER 15-I

SEVERANCE TOOL INDUSTRIES INC.
730 IOWA STREET
SAGINAW, • MICHIGAN

FAST PRODUCTION OF INTRICATE PARTS IN SINGLE OPERATION

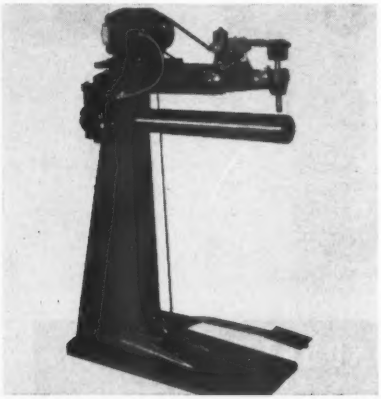
Illustration shows a few of the many intricate parts we are producing today at a high rate of speed in one operation on our special presses. If you have requirements of 100,000 pieces or more it will pay to investigate our methods.



ADAMS STAMPING CORP.
328 Adams St. Newark 5, N. J.

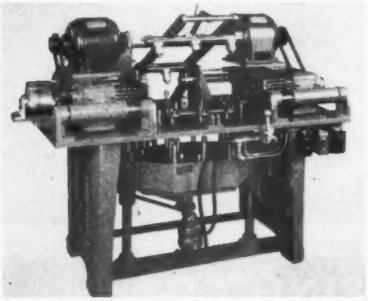
PROGRESS ON PARADE

A NEW SPECIALLY EQUIPPED HIGH SPEED RIVETING HAMMER having a 24" long steel arbor and especially suited to sheet metal work is comprehensively dis-



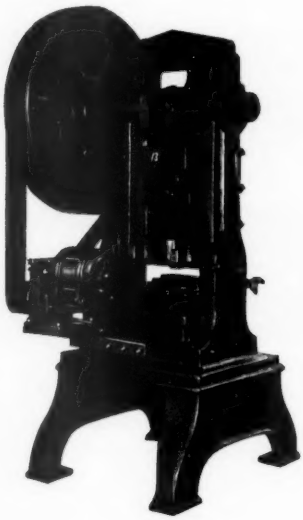
cussed in new literature from The High Speed Hammer Co., Inc. While the unit illustrated here has a capacity of from ⅛" to ¼" diameter rivets, units which have a greater or lesser capacity are also available. This unit and its companion riveting hammers are all thoroughly covered in this new literature available from THE HIGH SPEED HAMMER CO., INC., Dept. 32, 313 Norton St., Rochester 5, N. Y., or use INFORM-A-GRAM Key No. L32.

MULTIPLE DRILL PRESS DRILLS 30 HOLES SIMULTANEOUSLY in a 22" x 24" x 4¾" cast housing used on the Rotoplow Power Lawn Mower manufactured by R.P.M. Mfg. Co.

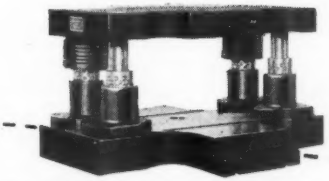


This drill press, built by Stanex-Campbell Co., which drills six holes in the casting from either side and the remainder upward from the bottom of the press by three separate multi-drill units, permits all drills to run at their required speed through proper gear ratio between spindles and through master guide bushing plates for constant accuracy. Also the drill units are operated by individual air feeds with the air cylinders synchronized to operate from one master valve. To obtain complete engineering data on this drilling unit write to Mr. Harry Campbell, STANEX-CAMPBELL CO., Dept. 10, 313 N. Lake St., Burbank, Calif., or use INFORM-A-GRAM Key No. M10.

PUNCH PRESS DRIVE, an individual electric motor drive designed to convert individual machine units from old-fashioned belting and countershaft arrangements to direct power, attaches quickly and easily to all types of punch presses. This drive, manufactured by

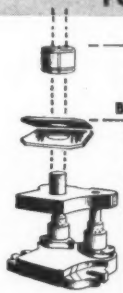


Cullman Wheel Co., can be installed on either inclinable, straight-side, or horning punch presses, and can also be furnished to convert some types of drill presses, power saws, hand mills, and other types of machines. Cullman punch press drives are made for motors ranging from ¼ to 10 hp and are furnished with standard flat belt pulleys, although vee-belt pulleys can be supplied if desired. Write for descriptive bulletin to CULLMAN WHEEL CO., Dept. 96, 1332 Altgeld St., Chicago 14, Ill., or use INFORM-A-GRAM Key No. 96.



DIES LAST LONGER IN LEMPCO ANTI-FRICTION DIE SETS

EXTRA PROTECTION FOR DIES



BALL JOINT SHANKS

eliminate perpendicular misalignment between shank clamp bushing and die set.

BALL ACTION DI-ALI-NERS

automatically correct punch press misalignment, front to back, left to right, or diagonal. Matched spherical plates, machined and cadmium plated for long life.

LEMPCO

• These *precision* sets guarantee perfect alignment of punches and dies.

Pre-loaded anti-friction bearings between leader pins and bushings never allow the slightest play. They prevent any lateral motion or tilting of the punch holder.

Punch and die engage squarely and cleanly every time. Clearance between cut edges is maintained. Chipping of edges is eliminated. You get more production per grind and longer die life.

Cash in on *all* the production built into your dies: stretch die life by mounting them in Lempco Anti-Friction Die Sets.

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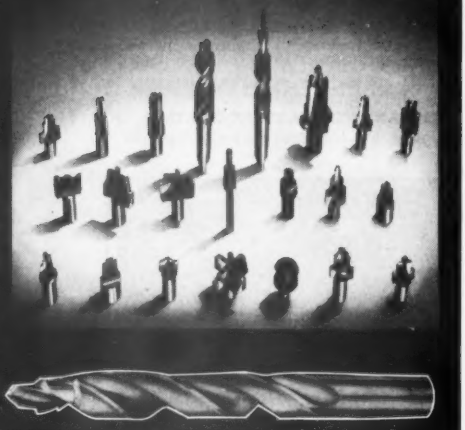
YOU CAN BANK ON OUR DELIVERY PROMISE. We make Eccentric Relief Cutting Tools, Carboloy-Tipped Cutting Tools, Step Drills, Step Reamers, etc. Tolerances are maintained exactly. Send us your sketch or blue print for quotation.
If it is a Cutting Tool We Make It.



SPIRAL MANUFACTURING CORP.

3616 N. KILBOURN AVE. CHICAGO 41, ILLINOIS

AN 80 TON TRYOUT PRESS, having all the features of their 40 ton press (illustrated), is now being made up into a working model by Alpha Tool Works. This special press, which will bring to light the necessary cor-

rections which often are not detected until the die has been shipped, allows the necessary finishing work to be done on both the male and female members without removal from the press. Position pins retract with a crank, allowing bolster and head to be tilted so that the die is made easily accessible for work. Dealer organizations for this new 80 ton press are being established as rapidly as possible and it is anticipated that a complete organization will have been formed by the time these presses are displayed at the ASTE show in March. Complete information is available from ALPHA TOOL WORKS, Dept. 20, 9281 Freeland Ave., Detroit, Mich., or use INFORM-A-GRAM Key No. L20.

COOLANT TEMPERATURE CONTROL UNIT, produced by Niagara Blower Company for

application to the New Britain-Gridley automatic screw machines, increases production by eliminating warm-up operations and subsequent tool adjustments. Also variations in the machine work caused by temperatures rising during operating periods are prevented. In addition the machine can be running at high speed, stopped, remain idle overnight—and still the temperature of the coolant is always within two or three degrees of a predetermined point, which effectively prevents harmful contraction or expansion of working parts. This new unit can be profitably adapted to all multiple-spindle automatics. Write the manufacturer, NIAGARA BLOWER COMPANY, Dept. 4-11, 405 Lexington Ave., New York 17, N. Y., or use INFORM-A-GRAM Key No. 411.

MATERIALS HANDLING "LIFT-O-KRANE" FOR PLANTS, WAREHOUSES AND YARDS that has both an interchangeable and demountable boom and ram in addition to the conventional forks, actually giving three "Lift-O-Kranes" in one, is announced by Silent Hoist & Crane Co. The illustration here shows the "Lift-O-Krane" as a boom crane and as a fork lift unit. If the boom alone is to be used, the forks are simply folded back and

stowed over the fenders. In addition this versatile machine handles loads of any shape or size up to five or seven and one-half tons, and it will transport and tier, stack and store, load and unload—all from the driver's seat. "Lift-O-Krane" may be purchased as a Ford truck unit exclusively, without boom or ram attachments; and it is also obtainable as a boom crane only, without forks or ram. Address SILENT HOIST & CRANE CO., Dept. 34, 841-877 63rd St., Brooklyn 20, N. Y., or use INFORM-A-GRAM Key No. M34.

make blade selection a cinch not a search

use the new

VICTOR WALL CHART

You'll see the name of the blade you want to use – hand, power or band saw – opposite the type of material you want to cut. You'll see this valuable information quickly, easily, when you tack the new Victor wall chart over your tool crib or in your machine shop.

What's more you'll get a lot of inside tips on how to get longer life, the best use, from every blade . . . There are plenty of ways to cut costs, make money, on this new Victor Wall Chart . . . It's printed clearly, attractively, and it's yours absolutely FREE.

Drop in on your Victor supplier – or send him a card today. *The supply is limited.* Also see him the next time you want the finest in cutting performance. He carries a full line of Victor blades – one for every job a hack saw or a band saw can do. Victor blades cut better, too, on metals, plastics, and other non-metallics . . . cut faster, cleaner, last longer.

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FOR EVERY LIFTING AND CARRYING JOB

Install PORTELVATOR. The Hamilton portable elevating table. One man can safely lift and carry loads previously requiring the strength of four.

Raises, lowers, transports. Three table surfaces. Accessible from four sides. Four point support. Standard model capacities, 1,000 to 5,000 pounds. Special models built on order.

Write for Bulletin P-47.

SUPER SENSITIVE DRILLING AND TAPPING MACHINES · PORTELVATORS

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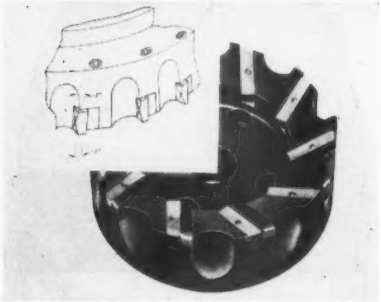
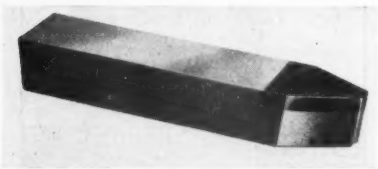
PROGRESS ON PARADE

AN IMPROVED GRIND FOR MAKING HEAVY SIDE AND FACE MILLING CUTS with solid carbide insert blade cutters has been developed by the Super Tool Co. Called "Bi-Axial", this new grind, successfully used on slotting cutters, shows, on tests, an offer-



ing of great improvement over conventional negative angle on milling cutters. This combination of negative radial and two negative axial rake angles has a "centering" effect on the cutter, stabilizing the pressure and eliminating flutter; and as a result, improved finish and longer cutter life are obtained. Examples of work produced by "Bi-Axial" grind and complete details are available from SUPER TOOL CO., Dept. 1-68, 21650 Hoover Rd., Detroit 13, Mich., or use INFORM-A-GRAM Key No. 168.

NEW CARBIDE TIPPED TOOL FOR PRODUCTION GROOVING designed for machining A, B and C belt size pulleys has been developed by Wendt-Sonis Co. Nose widths and angles on this tool are held to close tolerances for accurate production of the finished pulley; standard tools are furnished with proper grade of carbide inserts for the material to be machined. The carbide tips are covered with plastics to prevent chipping from handling and the shanks are scientifically hardened and treated to prevent

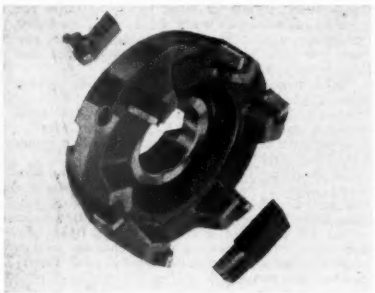


rusting. Shank sizes ranging from ⅝" x 1" to 1" square are available. WENDT-SONIS CO., Dept. 5-18, 10th and Collier Sts., Hannibal, Mo. INFORM-A-GRAM Key No. 518.

NEW M-B "SPEE-DEE" PNEUMATIC POLISHER, Model S-VT, developed to give maximum results when abrasive rolls, pencils, bands, etc., are used, is engineered for easy handling, is light in weight (14 ounces) and has a speed of 18,000 rpm. The spindle on this new polisher is made from a special alloy steel (heavy construction), heat treated and ground to close limits and accommodates mandrels ¼" diameter. A collet ¼" OD,

⅛" ID, is available for use in the spindle if desired. The outstanding feature about this polisher is its ability to produce production work and continue to do it with a minimum of time out for service. Literature and comprehensive details are available from M-B PRODUCTS, Dept. 86, 130-134 E. Larned St., Detroit 26, Mich., or use INFORM-A-GRAM Key No. A86.

NEW CARBIDE FACE MILL, known as the "E-CON-O-MILL", in standard sizes 5" in diameter and over, is announced by The Gairing Tool Co. The same blades and locks fit all sizes of cutter bodies, thus simplifying tool inventory, and the cone type bodies give full-height support to the blades, also providing unobstructed chip clearance. Reducing downtime on machines has been accomplished by this new face mill by cutting slots to such close tolerances as to permit replacing



individual blades without regrinding the entire cutter. Also, blades of the square toolbit type are furnished, with all clearance angles ground to a gage, ready for work. Complete data and prices are available from THE GAIRING TOOL CO., Dept. 8-00, 21227 Hoover Rd., Detroit 32, Mich., or use INFORM-A-GRAM Key No. 800.

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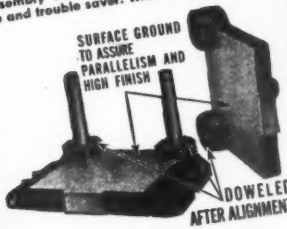
35 YEARS OF DIE SET MAKING

THE DIE-SET AUTHORITY

All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.



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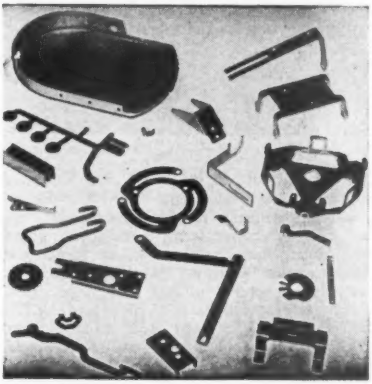

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For detailed information send for literature. For firm quotations and delivery commitments, send us your prints.

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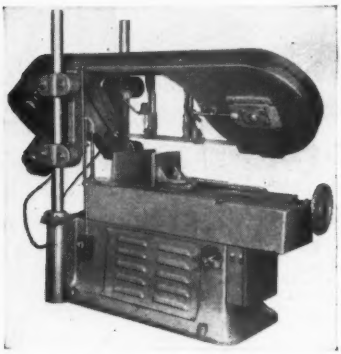
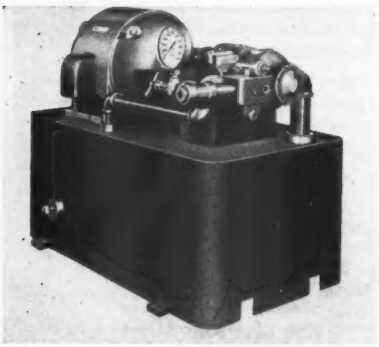
PROGRESS ON PARADE

HEAVY-DUTY HORIZONTAL METAL-CUTTING BAND SAW, designed for cutting off rectangular stock up to 12" deep by 16" wide or cylindrical stock up to 12¾" diameter, features an automatic cutting cycle which permits the blade to be fed into the work at

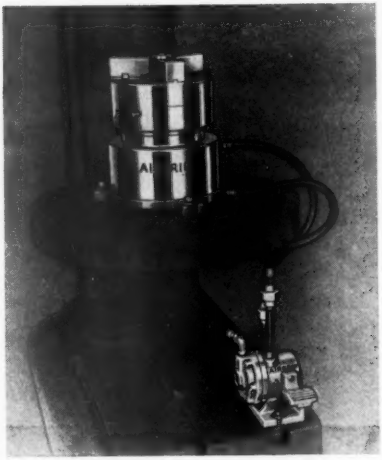


a constant pressure. In addition the cutting head is returned by hydraulic power to its starting position above the work upon completion of the cut. Another feature of this heavy, rigidly constructed saw is its ability to cut parallel to the bed to any desired depth for work on dies or other parts. Request full particulars from WELLS MANUFACTURING CO., Dept. 1-56, 1940 Ash St., Three Rivers, Mich., or use INFORM-A-GRAM Key No. 156.

IMPROVED HYDRAULIC PRESS UNITS for use in conjunction with hydraulic cylinders and other hydraulically operated equipment is announced by Hannifin Corp. Distinguished outwardly by streamlined appearance and compact arrangement, the new units provide for any required pump capacities from 1 gpm up, and for pressures to 2,000 psi or more. Standard equipment includes pump, pressure relief and adjusting valve, flexible pump-motor coupling, and hydraulic pressure gage. For further information on these hydraulic press units, and extensive data on hydraulic power circuits and hook-ups valuable for working out installations, address HANNIFIN CORP., Dept. 59, 1101 S. Kilbourn Ave., Chicago 24, Ill., or use INFORM-A-GRAM Key No. L59.



A NEW TYPE "AIRGRIP" DRILL PRESS CHUCK AND CYLINDER COMBINATION with "Airgrip" foot control air valve has just been introduced by the Anker-Holth Mfg. Co. Consisting of the standard "Airgrip" chuck mounted directly to a non-rotating cylinder and having a mounting base suitable for drill press or similar tables, this new combination will increase production where ex-



tensive drilling, tapping or counterboring operations are performed. A wide variety of uses in addition to those mentioned can also be performed with these drill press chuck units where neither the chuck nor the cylinder must revolve; for example, on assembly benches, milling machines, and special tapping machines. Write to ANKER-HOLTH MFG. CO., Dept. 9-52, 2735 Conner St., Port Huron, Mich., or use INFORM-A-GRAM Key No. 952.

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IS CAST IN OUR FOUNDRY EXCLUSIVELY

Just as a famous chef jealously guards the recipe for his masterpiece, so we guard the formula for *Strenes Metal*. That's why no other foundry produces *Strenes Metal* castings.

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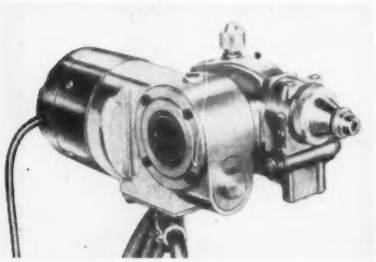
PROGRESS ON PARADE

"ANGLEVEL", A COMBINATION LEVEL AND ANGLE INDICATOR manufactured by R-D Company, is usable from all four surfaces with vials visible in any position, and with the added features of quickly determining angles, slopes, pitches, and inclines to a high

degree of accuracy. This new "Anglevel" offers everything that the craftsman now has in conventional levels, plus true and rapid measurement secured usually through the use of protractors or other expensive precision instruments. "Anglevel" is equipped with retainers into which vials (two horizontal, two vertical) are placed and give instant readings in these positions; also the retainers can be inserted, adjusted and positively locked into position in three minutes or less. Request further technical information and literature from R-D COMPANY, Dept. 33, P. O. Box 912, Flint, Mich., or use INFORM-A-GRAM Key No. M33.

COMPLETELY NEW TYPE METALLIZING GUN, powered by an electric motor called the "Moguelectric", by using different combinations of gearing, gives most spraying speeds to spray at top efficiency any of the metals used in the metallizing industry. Through the use of an electric drive, air requirements are materially reduced and turbine adjustments are eliminated. The only adjustments needed for this tool are gases



and air, and to put the gun in operation it is only necessary to turn on the switch and light the gun. Also there is no guesswork as to wire feed. Uses $\frac{3}{16}$" metallizing wire. Request particulars from METALLIZING COMPANY OF AMERICA, Dept. 3-89, 1330 W. Congress St., Chicago 7, Ill., or use INFORM-A-GRAM Key No. 389.

NEW MIDGET SIZE POWER DRILL, called the King Midget Power Drill, which features pistol grip, a polished aluminum body, geared-head motor, trigger finger control, and a six-foot quality cord, is discussed in new literature from Wolfson & Fairclough Mfg. Co. This new "King Midget" operates on 60 cycle, 110v ac at approximately 600 rpm and takes up to ¼" size bit. Especially designed for

craftsmen, this "King Midget" retails at less than seven dollars. Request additional data from WOLFSON & FAIRCLOUGH MFG. CO., Dept. 36, Buffalo, N. Y., or use INFORM-A-GRAM Key No. M36.

CLEANING, TESTING AND INSPECTING of Clark Hardness Testers sold by the War Assets Administration will be done without charge by Clark Instrument, Inc. These machines sold by W. A. A. on an "as is" basis in many cases suffered from neglect, and this service is given so that the purchaser will get full use from them. Charges will be

for only the actual cost of materials and labor, an estimate of which is furnished the owner before reconditioning. CLARK INSTRUMENT, INC., Dept. 1-20, 10200 Ford Rd., Dearborn, Mich. INFORM-A-GRAM Key No. 120.

TAP BREAKAGE *Reduced*

Square, Straight Tapping in Half the Time

The Dahlstrom Tap Guide practically eliminates tap breakage and saves wasted hours getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Just fasten it to a post or bench and slip a Tap Adaptor into the spindle. Even an inexperienced operator can handle it. Equipped with 7 Adaptors, ranging from 8-32 to ½". Taps not furnished. Ask your mill supply house, or $52.50 F. O. B. Minneapolis. *Literature on request.* Dahlstrom Manufacturing Co., 422 South Sixth Street, Minneapolis 15, Minnesota.

Dahlstrom TAP GUIDE

Send for complete catalog.

Being of low, horizontal design, these Knu-Vise toggle action clamps offer no interference to tools operating above them. There are no handles to handicap the free movement of drills.

There's a model to meet your specific need.

Model HF-100 has closed toggle bar—one rubber cap.
Model H-200 provides channel for positioning pressure spindle.
Model H-400 used where more clamping power is required.
Model H-600 provided with adjustable spindle.
Model HC-600 has closed toggle bar.

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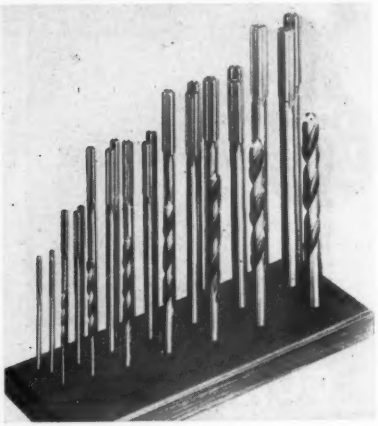
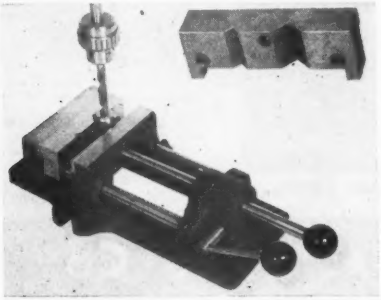
AVAILABLE NOW IN DECIMAL SIZES, the new reamers announced by the Twentieth Century Manufacturing Co. are available in sizes under and over the regular standards from .0461" to .0501". Reamers are now



stocked in over 509 different sizes at savings of from 20 to 150 percent on the decimal and smaller sizes. All flutes are ground on face and back after heat-treating for smooth reaming and to prevent clogging or freezing of chips. Sets have their individual serial numbers for inventory control. New literature and prices are available from TWENTIETH CENTURY MFG. CO., 3720 Montrose Ave., Chicago 18, Ill., or use INFORM-A-GRAM Key No. M11.

NEW DESIGN 6" DRILL PRESS VISE, called the Hartmann "600", has a movable jaw



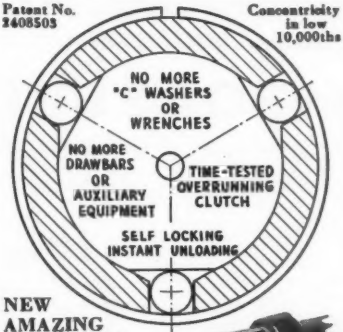
which is locked by direct lever action on a push lock, thereby eliminating the tedious waste of time and energy consumed in opening and closing screw-type vises. There are also no rings or threads to wear on the patented locking mechanism of the Hartmann "600". The locking lever arm engages a hardened cam, eccentrically pivoted in a collar. When the locking lever is pushed forward the cam exerts a gripping pressure on the rod attached to the movable jaw, thereby securing the workpiece in place and locking the jaws. The rod on this Hartmann "600" is hardened to Rockwell C62-65 and is precision ground. For further information on this Hartmann "600" together with its price address INDUSTRIAL ENTERPRISES, INC., Dept. T, 201 Sixth St., Racine, Wis., or use INFORM-A-GRAM Key No. M39.

A NEW PUNCH PRESS WITH SELF-ENERGIZING BRAKE, available in 70 and 100 ton capacities, differs from most presses in that the brake is applied only at the moment of clutch disengagement. As a result of the self-energizing brake the braking increases

in pressure until the crankshaft reaches zero speed. The brake action is synchronized with the clutch so that when the clutch engages, the brake disengages and remains free while the press is in motion. This gives considerable saving of horsepower and increases brake lining life. The clutch is cam controlled; no pins are used. The cam is mounted on the crankshaft which works the throwout yokes, resulting in a positive clutch action. Details on this punch press, including its operating and engineering data, are available from SUPERIOR PUNCH PRESS CO., Dept. 38, 3610 Superior Ave., Cleveland, Ohio, or use INFORM-A-GRAM Key No. M38.

Patent No. 2408503

Concentricity in low 10,000ths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For Production or Inspection

Curtiss-Wright Corporation ranks our product with THEIR best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

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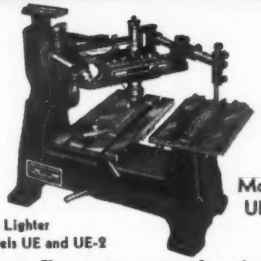

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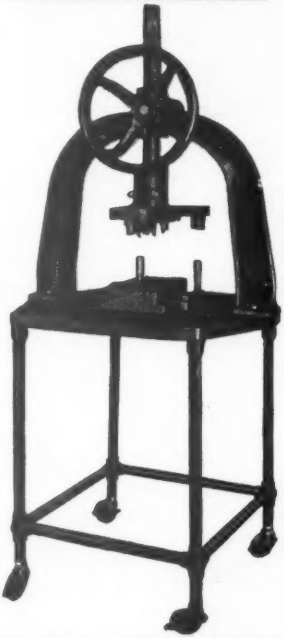

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Here is a truly "one man" press that operates with one hand and under full manual and visual control.

Handy for tool and press rooms, it permits the diemaker to complete a die-set *right at his bench* . . . saves tool room and handling costs.

Positive, true punch-to-die alignment is assured at all times, thanks to the Lacey's sturdy, open construction. And punches can be removed as often as needed without disturbing alignment once the die-shoe is clamped to the table and punch holder fixed in position in the ram. No pry bar or hammer is needed to separate punches.

The Lacey Die-Set machine is sensitive for delicate work yet rugged enough for fitting up heavy die-sets. Useful, too, for shearing certain types of punches.

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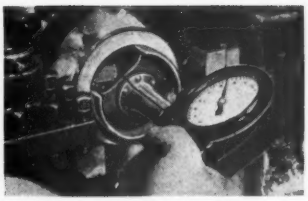

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used for bench inspection and AT or IN the machine.

Gages holes 1/8" to 8" dia. to fractions of .0001".

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Other Comtor Products:

"COMTORGAGE," Precision External Comparator: Bulletin 30

COMTOR SURFACE SMOOTHNESS COMPARATOR: Bulletin 32A

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PUBLICATION PREVIEWS

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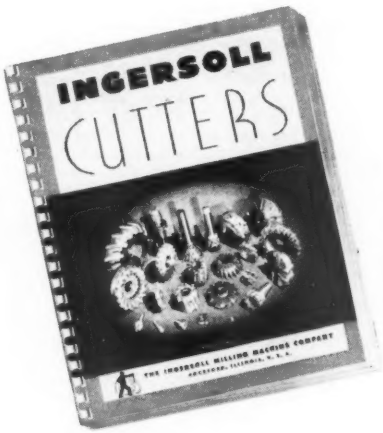
STANDARD INSERTED BLADE CUTTERS for milling and boring machines are fully described and illustrated along with information on what mill to use and when and where to



use it in Catalog 56-H, 80 pages designed to help in selecting standard cutters manufactured by The Ingersoll Milling Machine Co. Standard cutters suited for steel, cast iron, and for general cutting purposes on a wide variety of materials are completely treated as to application and engineering qualities. Also how their fields of application are so numerous that they overlap is explained so that each selection made is the correct one. Request this catalog from INGERSOLL MILLING MACHINE CO., Dept. 70, Rockford, Ill., or use INFORM-A-GRAM Key No. C70.

THE COMMANDER TAPPER with the patented thrust free spring clutch drive which eliminates slippage and wear caused by misadjustment and misuse is illustrated and completely described in a brochure from Commander Mfg. Co. Features covered include: the new torque of the tapper which can be adjusted to any point in its sensitivity range; its ability to handle any tap size from #0 to ¾; and how there is no wearing or needing of adjustment for the clutch surfaces as no felt, plastics, fiber, leather, cork, steel or brass is used. Also oil, grease, weather, etc., do not affect its operation. Request your copy of this tapper brochure from COMMANDER MFG. CO., Dept. T, 4225 W. Kinzie St., Chicago 24, Ill., or use INFORM-A-GRAM Key No. F35.

SMALL ELECTRIC HEAT TREATING FURNACES and their controlling and accessory equipment are illustrated and technically covered in a new 24-page catalog just published by Cooley Electric Mfg. Corp. How to select a furnace, how typical jobs are best performed to save time and money, and how this company can help solve controlled heating problems are also treated in conjunction with these versatile box furnaces. Complete specifications and prices for all models shown are also included. A copy of this catalog will be sent upon request from COOLEY ELECTRIC MFG. CORP., Dept. 5-87, 38 S. Shelby St., Indianapolis, Ind., or use INFORM-A-GRAM Key No. 587.

VIMCO ADJUSTABLE MACHINE LIGHTS for localized incandescent high-intensity lighting are widely illustrated and discussed in Folder No. 74, four pages of six standard models and a complete list of interchangeable parts for special lights released by Vimco Mfg. Co. The easy manner in which these Vimcolights are mounted on any machine, how their specially designed reflectors eliminate glare, and how their rugged flexible arms permit the operator to instantly direct the light where it is most needed are features fully treated. How-to-order information is also given. Write for your copy to VIMCO MFG. CO., Dept. 5-10, 117 Brayton St., Buffalo 13, N. Y. INFORM-A-GRAM Key No. 510.

PUBLICATION PREVIEWS

SWIRL TYPE DUST AND FUME ELIMINATORS are shown by cut-away sectional views, complete installation photographs, and thoroughly comprehensive schematic diagrams in a 12-page folder issued by Schmieg Industries, Inc. These dust and fume collec-

tor units, their use from foundry sand handling to grinding, buffing, burring, and polishing operation through welding flux dust, and other applications are technically discussed. Operation and maintenance of the Schmieg dust and fume collectors are also technically treated. Request a copy from SCHMIEG INDUSTRIES, INC., Dept. 4-54, 312 Piquette Ave., Detroit 2, Mich., or use INFORM-A-GRAM Key No. 454.

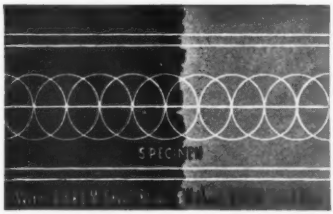
"TEN RULES FOR GOOD TOOLS" is the title of a formula for "good" perishable tools and dies put into calendar form by the Columbia Tool Steel Co. This calendar, the result of an intensive investigation and classification of tool steel failures made by Mr. A. J. Scheid, Jr., metallurgist of the company, has been prepared in an effort to forestall the majority of tool failures. A few of the rules publicized and set forth in this valuable calendar include the five types of tool steels, each type's advantages for a particular operation over another; tool design; surface removal; hardening equipment; setup; etc., plus other information which tells about tool steels and their use. COLUMBIA TOOL STEEL CO., Dept. 39, Chicago Heights, Ill., or use INFORM-A-GRAM Key No. E39.

A FIXTURE FOR HOLDING TAPS WHILE GRINDING FLUTE RELIEF AT CUTTING END with tap capacity of from #8 to ⅝" (can be employed for smaller or larger sizes if wanted) is described in new literature from the Wick Company. This new fixture accommodates taps with two to six flutes, right- or left-hand, and produces relief or back-off at the cutting portion of the flutes by eccentric action. It mounts the tap between centers on a cutter grinder or in a lathe equipped with a tool-post grinder, and is adaptable to all types of such machines since it will be shipped with a straight or tapered shank of any size desired. Full particulars on this fixture are available from the WICK COMPANY, Dept. 37, 114 Elm St., Meriden, Conn., or use INFORM-A-GRAM Key No. M37.

"NUPLA" MALLETS WITH INTERCHANGEABLE TIPS which will not mar or damage delicate, painted, polished or plated surfaces are illustrated and completely described in a brochure issued by Acme Tool Co. These mallets and their interchangeable tips that give no sting, vibration or rebound are not affected by oil or gasoline. If desired, they can be had in the non-conductor type for electrical work. Complete mallets, extra nupla tips, and nylon tips with their prices and sizes are also included. Request a copy of the "Nupla" Mallet brochure from ACME TOOL CO., Dept. 69, 71 W. Broadway, New York 7, N. Y., or use INFORM-A-GRAM Key No. 69.

REAMERS, BORING BARS AND A WIDE VARIETY OF SPECIAL CUTTING TOOLS are featured in a new cutting tool Catalog (No. 48) published by Wetmore Reamer Co. Profusely illustrated by photographs and with blueprints for easy reading, this tool catalog also contains an abundance of engineering data for the tool user, buyer and engineer alike. Request a copy of this new tool procurement catalog from WETMORE REAMER CO., Dept. 8-38, 418 N. 27th St., Milwaukee 8, Wis., or use INFORM-A-GRAM Key No. 838.

AUTOMATIC ROLL FEEDS for automatically feeding stock into punch presses are made in various types to meet almost every requirement of feeding stock from coils or strips and to fit all sizes and makes of presses. These feeds and their various types together with their principle, method of operation, application and use, and installation adjustment are comprehensively described and illustrated in a four-page bulletin from La Bahn Machine & Mfg. Co. Lower production costs, increased production, and direct labor savings as are effected from the use of these feeds are also included. Request a copy from LA BAHN MACHINE & MFG. CO., Dept. 27, 550 Lincoln Highway, Menlo Park, N. J., or use INFORM-A-GRAM Key No. M27.



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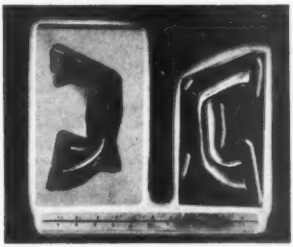

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Size 6". Graduation 1/40", vernier reading .001, catalog No. 21; graduation 1/40" and full mm, vernier reading .001 and 1/10 mm, catalog No. 22. Also AMIC precision Vernier Calipers, Height Gages, Depth Gages, Pocket Calipers, Precision Graduated Metal Scales.

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PUBLICATION PREVIEWS

ADJUSTABLE, SELF-CENTERING "WESTLEN REELS" for flat and wire coil stock and which eliminate tipping and backlash are illustrated and operationally discussed in a folder published by The Ruleta Co., Inc. Features which are discussed and shown, along with illustrations of the "Westlen Reel" in both a horizontal and vertical position, include the adjustment wheel, adjustable spider, and the positioning arms. Complete specifications and the price of this machine are also given. Obtain a copy by writing THE RULETA CO., INC., Dept. 28, 27 Warren St., New York 7, N. Y., or use INFORM-A-GRAM Key No. M28.

"SPEED-CUT" DIE STEEL is now available in plates of large area when specified, announces the manufacturer, Vanadium Alloys Steel Co. Speed-Cut is furnished on order in the following sizes: widths up to 20 inches, 1 to 8 inches thick; widths from 20 to 30 inches, 1 to 5½ inches thick; widths from 30 to 32 inches, 2 to 4½ inches thick. A tough, close-grained, homogeneous die steel which permits high surface finishes, Speed-Cut has high surface hardness which offers excellent resistance to abrasion. When used for mold plates, Speed-Cut is furnished heat treated to 260-300 Brinell, and is free-machining at that hardness. Technical literature on Speed-Cut may be obtained from VANADIUM-ALLOYS STEEL CO., Dept. 71, Latrobe, Pa., or use INFORM-A-GRAM Key No. J71.

JARVIS "TORQOMATIC" TAPPING ATTACHMENT and its ability to produce quality threads, increase tapped holes per hour, save taps, and give trouble-free performance, are all completely described in an illustrated eight-page catalog issued by The Charles L. Jarvis Co. Included are sections on tips for tappers, obtaining maximum hourly threading at low cost, and the proper care of tappers. A schematic diagram of the "Torqomatic" which shows all parts of this torque-driven tool and its operation is a feature of the catalog. Your copy will be sent upon request by THE CHARLES L. JARVIS CO., Dept. 74, Middletown, Conn., or use INFORM-A-GRAM Key No. K74.

PORTABLE OR STATIONARY HORIZONTAL MACHINES FOR DRILLING AND TAPPING, from practically any location and with machine spindle in almost any position, are completely covered and dimensionally illustrated in an eight-page catalog from Kaukauna Machine Corp. The models treated include: Model 125-H, with universal head, rotates 360° and swivels 180°; Model 1030, with tilting horizontal head, permits approaching cutting tool to work from a wide variety of positions; Model 125-HR, with horizontal head on rail, permits 36" total spindle movement radially from column center; and Model 125-H, with stationary horizontal head, permits lowering machine through small openings and working in restricted space. Address KAUKAUNA MACHINE CORP., Dept. 86, Kaukauna, Wis. INFORM-A-GRAM Key No. K86.

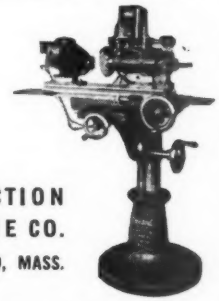
STATIONARY, ROTATING AIR CYLINDERS AND AIR-OPERATED VISES are illustrated, shown by schematic diagrams, and priced in Catalog 91, 16 pages of design features on air and hydraulic equipment manufactured by Logansport Machine Co., Inc. Also given is a section on how these products can be used "in your plant and on your products" at low cost for pushing, lifting, holding, pulling, tilting, clamping, etc. Included are details on the engineering aspect of these cylinders and vises which show why they are fast-acting and how they give positive, controlled power. All dimensions are also given. Address LOGANSPORT MACHINE CO., INC., Dept. 3-27, W. Linden Ave., Logansport, Ind. INFORM-A-GRAM Key No. 372.

GAUNTLETT HYDRAULIC BAR BENDER, its single control, complete operation, and special features are covered along with operational photographs in a four-page bulletin released by J. M. Gauntlett Co., Inc. The method of operation (controlled from one knob conveniently placed at the operator's side), and the way in which all bends are made away from the operator for safer operation are discussed, together with how, with the release of the knob, the valve automatically moves to a neutral position, locking the machine in position and allowing no creep or springback. All components of the machine, including table top, bender, sleeves and pins, and special dies, are treated. Address J. M. GAUNTLETT CO., INC., Dept. 35, 1247 N. Westlake Ave., Seattle 9, Wash., or use INFORM-A-GRAM Key No. M35.

NEW FOUR-SPEED FLEXIBLE SHAFT MACHINE which is made in bench, floor and vertical types embodies the newest and only major improvement in flexible shaft equipment in 25 years, according to a four-page bulletin issued by N. A. Strand & Co. The outstanding feature of this machine is the "Rotoflex" four-speed gear drive, which utilizes four positive speeds by a unique and easy method of instantly changing from one speed to another. This is accomplished through an eccentric driving shaft sleeve assembly, by which one or more master gears may be engaged by a slight rotary motion as well as axial movement of sleeve for several different speeds. This entirely new process for flexible shaft machines and its resulting better grinding are explained in Bulletin 43. Request it from N. A. STRAND & CO., Dept. 29, 5001-9 N. Wolcott Ave., Chicago 40, Ill. INFORM-A-GRAM Key No. M29.

TOOLROOM VERSATILITY

Easily set up attachments make this GREENFIELD No. 4 Tool & Cutter Grinder an invaluable production and toolroom machine for grinding formed cutters, taper and rose reamers, and compound angles, as well as straight surface work. Heavy, rigid construction, adjustable table, generous bearing areas, attachments for cylindrical and internal grinding.
Write for bulletin No. 2 for further details.



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PUBLICATION PREVIEWS

RUBBER FOR DEEP DRAWING, bulging, knock-out and pressure pad on punch press or other machines is one of the many accessories in the E. A. Baumbach Manufacturing Company's line of die sets and complete available accessories illustrated and described in their new folder. Demountable bushings, leader pins, and punch holder shanks, which enable you to make your own die sets, plus die shoe clamps, ground machined steel plates and discs, etc., are also featured in this folder. Ask for your copy of this "Good News" folder from E. A. BAUMBACH MFG. CO., Dept. 14, 1812 S. Kilbourn Ave., Chicago 23, Ill., or use INFORM-A-GRAM Key No. J14.

BUR-OLOGY is the title of a 36-page pocketbook size manual published by Pratt & Whitney which gives valuable and helpful data for obtaining the most efficient use from the bur. A few chapter headings in BUR-Ology include: A Short History on Burs; What Modern Burs Are Like; Typical Bur Standard Shapes and Where They Are Used; Proper Bur Speeds for Efficient Cutting; and How to Convert Worn File-Cut Burs. Another chapter entitled "A Few Hints on Bur Usage" treats such subjects as heavy work, hand positions, speed selection, and cutting aluminum. A copy of this bur reference book will be sent upon request from PRATT & WHITNEY, Div. Niles-Bement-Pond Co., Dept. 4-30, 1 Charter Oak Blvd., West Hartford 1, Conn., or use INFORM-A-GRAM Key No. 430.

PRECISION BALL BEARINGS that embody great care in selection of material, exactness in manufacture controlled by rigid inspection, and the use of non-ferrous metal retainers are factors and features which assure successful operation of these bearings and which are thoroughly covered in a 32-page catalog from McGill Mfg. Co. In addition to giving tables which show length of service, safety factor for type of load, and recommended shaft and housing fits for these precision bearings, cutaway photographs and schematic diagrams show pertinent manufacturing data. A useful table on millimeters to inches and one on fractional inch equivalents are also included. For your copy of Catalog No. 17-G write to McGILL MFG. Co., Dept. 63, 1200 N. Lafayette St., Valparaiso, Ind., or use INFORM-A-GRAM Key No. E63.

DIAMOND B-12 MILLING MACHINE and accessories are shown by twenty illustrations in a new four-page catalog issued by Diamond Machine Tool Co. This catalog is unusual in the machinery manufacturing line as the price of the B-12 milling machine is printed in bold letters on the front cover. The other pages are devoted to specifications, method of manufacture, performance, and the reasons for the low price of the versatile machine. Obtain a copy of this catalog by writing the DIAMOND MACHINE TOOL CO., Dept. 2-68, 3421 E. Olympic Blvd., Los Angeles 23, Calif., or use INFORM-A-GRAM Key No. 268.

DIE SETS AND ACCESSORIES, including dowel pins, bushings, pry bars, leader pins, lapping plates, die stops, etc., are all illustrated and shown by schematic diagrams in Catalog No. 6; 26 pages of complete die needs published by U. S. Tool Co., Inc. Technical descriptions, plus engineering data and prices for the complete line of die sets and accessories listed in this catalog, make it a useful and handy procurement manual on die equipment. Obtain a copy of Catalog No. 6 from U. S. TOOL CO., INC., Dept. 5-05, 258 N. 18th St., Ampere (E. Orange), N. J., or use INFORM-A-GRAM Key No. 505.

ILLUSTRATED EXAMPLES of how the Turchan Hydraulic Follower machine can be used for duplicating dies, moulds, patterns or original forms from hard or soft models with fidelity, accuracy and extreme rapidity are contained in a new catalog recently issued by Turchan Follower Machine Co. Specifications, descriptions and actual photographs of the machine are included in the catalog. Get a copy by writing to TURCHAN FOLLOWER MACHINE CO., Dept. 1-04, 8259 Livernois, Detroit 4, Mich., or use INFORM-A-GRAM Key No. 104.

BALL BEARING CENTERS, shank type, ball and roller bearing type, and the outside spindle type, are shown by illustrations and schematic diagrams in a new four-page technical bulletin issued by The Ready Tool Co. In addition to presenting the principal features, engineering data and complete specifications for these ball bearing centers, a section of this folder is devoted to special applications. Their use where carbide cutting tools are used and for precision grinding operations is also given complete treatment. For your copy of Bulletin No. 471, write to THE READY TOOL CO., Dept. 42, 550 Iranistan Ave., Bridgeport 5, Conn., or use INFORM-A-GRAM Key No. L42.

HORIZONTAL DEEP HOLE DRILLER arranged so the various drilling and reaming methods can be readily obtained is illustrated by photographs and schematic diagrams in Bulletin 647, published by National Automatic Tool Co., Inc. Bulletin 647 explains the operation of the machine for revolving both the drill and work, the work only, or only the drill. Complete specifications are included. Obtain this drilling bulletin from NATIONAL AUTOMATIC TOOL CO., INC., Dept. 69, Seventh & North Sts., Richmond, Ind., or use INFORM-A-GRAM Key No. E69.

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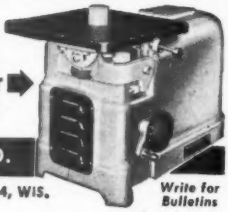

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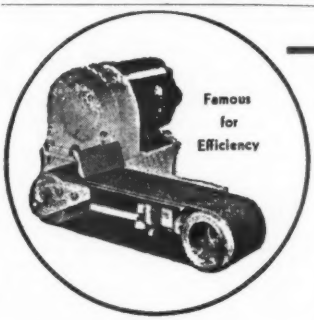

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HOW THE PROBLEMS AND COSTS OF JIGS for drilling, counterboring and tapping operations can be eliminated with the Man-Au-Trol Spacer is discussed in a catalog issued by the Bullard Co. The unit is a semi-automatic movable work table to which work may be attached for accurately positioning it in a multiplicity of predetermined locations under the spindle of various types of drilling machines. Obtain from THE BULLARD CO., Dept. 2-20, Bridgeport 2, Conn., or use INFORM-A-GRAM Key No. 220.

SEVERAL NEW AND EXCLUSIVE FEATURES of Easy-Flo 45, a recently announced silver brazing alloy, are described in a new bulletin No. 15, issued by Handy and Harman. Its lower silver content, lower operating temperature and fast spreading ability are factors which should interest all manufacturers who join metals. Illustrations of typical applications and a tensile strength chart are included in the bulletin. Address request to HANDY & HARMAN, Dept. 3-10, 82 Fulton St., New York 7, N. Y., or use INFORM-A-GRAM Key No. 310.

A NEW AIR-HYDRAULIC FEED DRILL HEAD for drilling, milling, boring, tapping and turning is illustrated and described in a recent bulletin. A cut-away-view illustrates outstanding features of the drill advancing mechanism which is constructed of a very few parts, none of which is subjected to heavy wear conditions. Specifications of five standard models are given and a list of hydromat accessories. Obtain the bulletin from INDUSTRO-MATIC CORP OF AMERICA, Dept. 74, 136 W. 52nd St., New York 19, N. Y. INFORM-A-GRAM Key No. L74.

A NEW METHOD FOR HARD FACING by using a metallizing gun and Metco-Weld H, a "wire" compound of a powdered, hard-facing alloy extruded with a plastic binder, is technically discussed in Bulletin 53 issued by Metallizing Engineering Co., Inc. While spraying, the plastic binder is volatilized and the subsequent fusing results in a coating that is alloyed to the base and which gives excellent resistance to abrasion and corrosion. Bulletin 53, which completely describes this hard-facing, will be sent upon request from METALLIZING ENGINEERING CO., INC., Dept. 3-89, 1318 W. Congress St., Long Island City. INFORM-A-GRAM Key No. 389.

HAND AND FOOT OPERATED VALVES for air and hydraulic lines, and speed control valves for use with air and hydraulic cylinders, are illustrated and discussed from an engineering viewpoint in the new Hanna Engineering Works' eight-page folder. The exclusive features and operating data of these valves, providing for their simple, effortless control of air and hydraulic lines of cylinders, are presented in schematic diagrams and charts for production-wise engineers. HANNA ENGINEERING WORKS, Dept. 8-09, 1765 Elston Ave., Chicago 22, Ill., or use INFORM-A-GRAM Key No. 809.

ERRINGTON PRODUCTION ATTACHMENTS, including drill and tap chucks, nut and screw drivers, self-opening die heads, quick change chucks, and fixed center multiple drilling and tapping heads are products of the Errington Mechanical Laboratory, Inc., which are given complete coverage in their new eight-page catalog. Photographs and drawings, complete ordering instructions, and comprehensive specifications provide all pertinent data on these production necessities. A copy will be sent upon request from ERRINGTON MECHANICAL LABORATORY, INC., Dept. 96, 24 Norwood Ave., Staten Island 4, N. Y., or use INFORM-A-GRAM Key No. L96.

"SAFETY" MARKING TOOLS are featured in an unusual new bulletin published by M. E. Cunningham Company. The wide variety of marking tools, engineered and manufactured to meet the most exacting demands of modern safety practices in marking operations, are described and illustrated in bulletin J-547. Each tool is made of Mecco alloy steel which eliminates mushrooming and spalling, minimizing accidents caused by flying chips of steel. Write for copies to M. E. CUNNINGHAM COMPANY, Dept. 1-70, 104 East Carson St., Pittsburgh 19, Pa., or use INFORM-A-GRAM Key No. 170.

THE TOOLMAKER'S MICROSCOPE and the various ways in which it may be used throughout the shop and in inspection are illustrated and technically discussed in a reprint article available from George Scherr Co., Inc. How this practical tool lends itself to numerous high precision measuring and checking jobs from threads to drill jigs, and its simplicity for operator use, are highlgihts of the article that toolroom and machine shop supervisors will appreciate. Request this article, "Toolmaker's Microscope", from GEORGE SCHERR CO., INC., Dept. 4-90, 197-A Lafayette St., New York 12, N. Y., or use INFORM-A-GRAM Key No. 490.

COLLETS AND PUSHERS, work holding devices for every automatic screw machine, turret lathe and miller, are illustrated and described in a 22-page catalog issued by The Benco Collet & Mfg. Co. In addition to featuring their master type collet, pusher and pads in this catalog of complete prices and specifications, the company also lists their standard types of these items as designed by the machine builders. Ask for Catalog No. 45 from THE BENCO COLLET & MFG. CO., Dept. 99, 1557 E. 27th St., Cleveland 14, Ohio, or use INFORM-A-GRAM Key No. L99.

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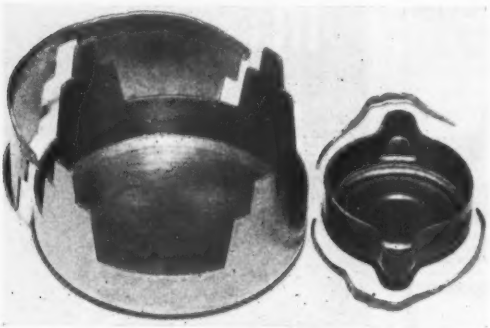

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A NEW SECTION ON INSTRUCTION PROGRAMS for use in a shop or school training courses has been incorporated in the 12th edition of "DoALL Contour Saws"; 413 pages of descriptions through photographs, charts and drawings of the techniques for contour sawing and filing, also high speed sawing

and the friction cutting methods with band sawing equipment. It compares the performance of these machines with other basic machine tools and elaborates with facts and figures recommending proven procedures for sawing all types of materials. The second part of this book, embodying a self-training course for apprentices and machinists, gives a complete instruction course on contour machining with 23 work projects, demonstrations and grading tables for a trainee's progress in passing tests. This instruction program has been laid out as a guide which will encourage trainees to develop new applications and techniques and to recognize machining short cuts possible with sawing machines. Shop work projects follow classroom instruction in which careful workmanship and proper machine adjustment and maintenance is emphasized. A copy of "DoALL Contour Saws" will be sent to those requesting it upon company letterhead. Address The DoALL Company, Des Plaines, Ill., Dept. 1-30, or use INFORM-A-GRAM Key No. 130.

FEDERATED DI-METAL is a zinc base alloy of high purity produced in three grades containing primarily aluminum and magnesium, together with varying amounts of copper. Thus begins Chapter 1 entitled "Metallurgy of Di-Metal" in the 28-page widely illustrated catalog on the "Nature of Die Casting", published by Federated Metals Div., American Smelting & Refining Co. Other know-how chapters are: Selection of an Alloy for Die Casting; Factors to be Considered When Designing Die Castings; and Dimensional and Weight Limits for Die Casting in Different Alloys. This "how-to-do-it" catalog will be sent upon request from Federated Metals Div., American Smelting & Refining Co., Dept. 95, 120 Broadway, New York 5, N. Y., or use INFORM-A-GRAM Key No. L95.

FIRST COMPLETE MANUAL ON BROACHING and catalog of broaches published in the Dominion of Canada has just been released by Colonial Tool Co., Ltd., and comprises some 76 pages of important broaching know-how for the Canadian metal-working industries. Divided into four widely illustrated sections, the manual treats 1) How a Broach Works, 2) Broaching at Work, 3) Pointers on Broaching, and 4) Broaches. Each of these sections completely covers its subject, including such information as factors in broach design; preparing for broaching (materials, speeds, coolants, etc.); estimating production; broach sharpening; processing and examples of broaching straight-sided, involute and spiral splines; and engineering data on broach. Also a complete cross-index is provided enabling rapid location of data on broach subjects treated. Canadian metal-working industries may secure a copy by writing Colonial Tool Co., Ltd., Dept. 40, Windsor, Ontario, Canada, or use INFORM-A-GRAM Key No. C40.

SHOP AIDS

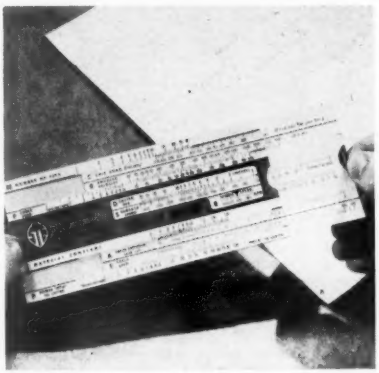
A HANDY DEVICE THAT GIVES MACHINING SPEEDS AND FEEDS QUICKLY for all common machining operations on stainless steel is available from Republic Steel Corp. Other operations such as form cutting, milling

and drilling, usually performed on an automatic, are also included on this new circular, "Cutting Speed and Feed Selector". This Selector will also convert surface cutting speeds to spindle speeds for stock from 0.1" to 8" diameter. Obtain your Selector from Republic Steel Corp., Dept. 27, 3100 East 45th St., Cleveland 4, Ohio, or use INFORM-A-GRAM Key No. 27.

THE BASIC REASONS FOR SURFACE WEAR AND ITS RELATION TO SURFACE FINISH, why ground and machined surfaces have been unsatisfactory, what are the causes of wear, and a complete description of an inexpensive method of producing a new standard of surface quality are contained in a new 80-page, fully illustrated textbook entitled "Wear And Surface Finish", by E. L. Hemingway, Research Engineer, Gisholt Machine Co. Both the measurement of surface roughness and its correction by Superfinishing are included. The controversial subject of when to use a scratch pattern and when to use an ultra smooth finish is also discussed in detail. Among the chapters on wear and finish which describes all natures of their aspects are: Types of Surface Damage; Relation of Surface Finish to Wear; The Efficient Oil Film; Tests of Load Capacities of Different Surface Finishes, etc. Fully one-third of this surface treatise book is devoted to large and clear illustrations which add to the valuable information given. "Wear And Surface Finish" will be sent to those requesting it upon company letterhead from Gisholt Machine Co., Dept. 3-03, 1245 E. Washington St., Madison 3, Wis., or use INFORM-A-GRAM Key No. 303.

FIRST IN A SERIES OF BOOKLETS ON INDUSTRIAL PRECISION CASTINGS, devoted to equipment and materials, is offered by Kerr Dental Mfg. Co. Pertinent information on the most successful precision casting processes utilizing Kerr equipment, along with a description and specification of the machines necessary to achieve precision with volume production. The latter sections are devoted to the Kerr materials developed during more than half a century of casting in the dental, jewelry and industrial fields. Illustrations of the engineering and research facilities for planning the shop layout, to recommending and designing special machinery to fit circumstances, are included. Obtain this valuable booklet from Kerr Dental Mfg. Co., Industrial Div., Dept 10, 6081 Twelfth St., Detroit 8, Mich., or use INFORM-A-GRAM Key No. K10.

POCKET CALCULATOR which works on the slide rule principle and readily computes tooth load, table feed, spindle rpm, and the required horsepower for carbide milling operations is announced by the Super Tool Company. The proper cutter to be used for various hardnesses and types of steel as well as non-ferrous metals can also be instantly determined with this new plastics calculator. The proper



speeds, feeds, etc., for carbide milling that heretofore were selected by experienced job setters can now be accomplished, with this new slide rule, by inexperienced men. For your calculator send 50 cents to the Super Tool Company, 21650 Hoover Rd. at Berry St., Detroit 13, Mich.

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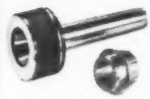

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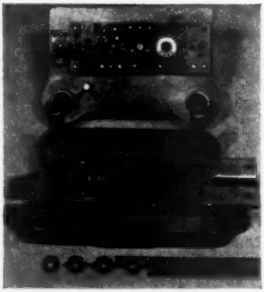

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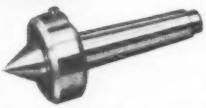

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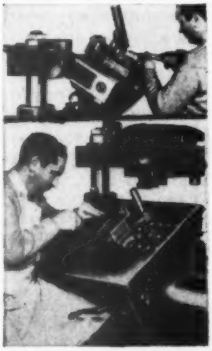

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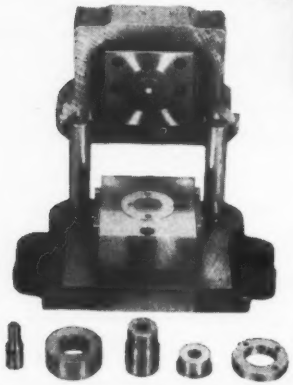
YOUR SPECIAL WASHER TROUBLES WITH

HOVIS

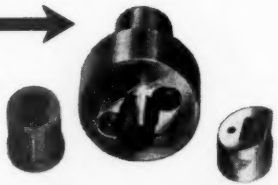
UNIVERSAL MASTER WASHER DIES



Make washers the Hovis way; save time, labor, materials. Simply invest in Hovis Master Dies to meet your requirements, then by using five small interchangeable parts, you can make new size washers, eliminating the necessity of making new dies. You can make washers on short order, saving the expense of keeping large inventories on hand.

A great many manufacturers also use the Hovis Master Washer Die as a holder for making various blanks in their own die room, eliminating the cost of new die sets.

Use This SPECIAL HOLDER →



FOR HOLDING INTERCHANGEABLE PUNCHES, COMPOUNDS AND BUTTON DIE, which can be adapted to fit the ram of any press. An inexpensive and valuable accessory. Sizes from ½" to 3". We also specialize in the manufacture of Intricate Punches and Dies.

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